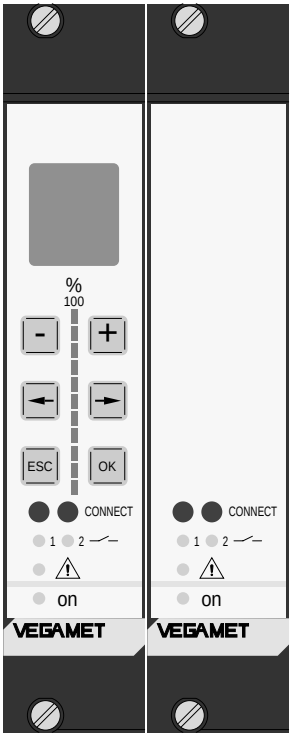
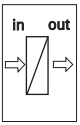
Level and Pressure

Operating Instructions

VEGAMET 514





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1 Product description

1.1 Function and configuration

VEGAMET 514 is a signal conditioning instrument for a number of applications, e.g.:
- level measurement
- gauge measurement
- process pressure measurement
- measurement with automatic correction
- etc.

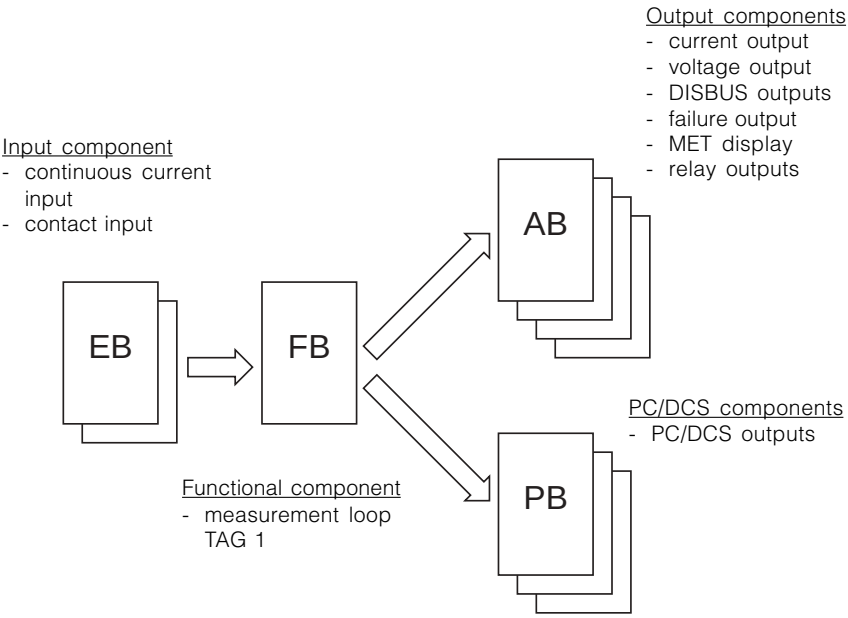
Function

The signal conditioning instruments power the connected sensors and process their analogue measuring data. The conditioning is done via a special software consisting of functional components (FB), input components (EB), output components (AB) as well as DCS components (PB).

Configuration

The VEGAMET 514 signal conditioning instrument is constructed as module card in European size with 5 TE (= 25.4 mm) width. The front plate contains an adjustment module with LC display and keys. The front plate of VEGAMET 514 N does not contain an adjustment module.

Software configuration



1.2 Approvals

VEGAMET are available with the following approvals:
- explosion protection: appropriate operating instrument with intrinsically safe circuit (VEGAMET 514 Ex)
- overfill protection acc. to WHG

For such applications, please note the appropriate official documents (general type approval, test and conformity certificates). They come with the respective instrument

Ex approval

For hazardous areas, certification acc. to CENELEC defined in the conformity certificate PTB no. Ex-95.D.2145 X for VEGAMET 514 Ex.

WHG approval

Signal conditioning instrument as part of an overfill protection system acc. to WHG (test certificate number see table).

1.3 Features

- microcomputer-controlled signal conditioning instrument for continuous measurement
- adjustment module with LC display and 6 keys (not with VEGAMET 514 N)
- adjustable integration time
- two fixed and three user-programmable linearisation curves
- fault monitoring
- fault signal and failure diagnosis via display

Inputs:
- 1 sensor input (capacitive electrode, pressure transmitter or other 4 ... 20 mA sensor)
- 1 correction input (for key, switch or level switch)

Outputs:
- 1 current output 0/4 ... 20 mA
- 1 voltage output 0/2 ... 10 V
- 2 relay outputs (spdt)
- 1 DISBUS output for digital wiring and for connection of VEGADIS 174
- 1 fail-safe relay
- adjustment also via PC with adjustment software VVO; connection via the interface adapter of the VEGACONNECT series

Instrument	Oscillator	VEGAMET	Test certificate no.	Auxiliary level switch VEGASEL
Capacitive electrodes EL 11 EX0, EL 21 EX0, EL 24 EX0, EL 29 EX, EL 31 EX0, EL 42 EX0	E17 EX E18 EX	514 EX	Z-65.13-123	543 ... 547 643
Pressure transmitters D80, D81, D84, D86, D84 EX, D86 EX	E23, E23 Ex	514 514 EX	Z-65.11-130	543 ... 547 643
Pressure transmitters D77, D85, D87, D77 EX, D85 EX, D87 EX	E22, E22 Ex	514 514 Ex	Z-65.11-130	543 ... 547 643

1.4 Technical data

Power supply

Operating voltage	U_{nom} = 24 V AC (20 … 53 V), 50/60 Hz = 24 V DC (20 … 72 V)
Power consumption	approx. 6 VA or approx. 4 W

Meas. data input

Number	1 input
Input type	active two-wire input, analogue (sensor is powered by VEGAMET)
Range	4 … 20 mA
Sensor	capacitive electrodes, pressure transmitters, process pressure transmitters, differential pressure transmitters
Voltage	
- at 4 mA	approx. 18 V DC
- at 20 mA	approx. 15 V DC
Current limitation	at approx. 26 mA, short-circuit-proof
Detection line break	< 3.6 mA
Detection short-circuit	> 21 mA
Min. adjustment delta	2 % of the entered sensor values
Connection cable	2-wire standard cable (screening recommended)
max. resistance per wire	35 Ω
Resolution	1 µA
Linearity error	0.025 % at 4 … 20 mA
Temperature error	0.04 %/10 K at 4 … 20 mA

Correction signal input

Number	1 input
Function	switching signal for triggering corrections or special relay modes via external switching contact
Voltage	5 V (from instrument)
Current	5 mA
External cable resistance	≤ 150 Ω

Current output

Number	1 output
Function	analogue output of the processing results
Range	adjustable between 0 … 20 mA
Load	max. 500 Ω
Resolution	1 µA
Linearity error	0.05 % (relating to 20 mA)
Temperature error	0.05 %/10 K (relating to 20 mA)

Voltage output

Number	1 output
Function	analogue output of the processing results
Range	adjustable between 0 ... 10 V
Current	max. 1 mA
Resolution	0.5 mV
Linearity error	0.05 % (relating to 10 V)
Temperature error	0.06 %/10 K (relating to 10 V)

Relay output

Number	2 switching relays 1 fail-safe relay
Contact	floating spdt
Contact material	AgNi, hard gold plated
Turn-on voltage	min. 10 mV DC max. 250 V AC/DC
Switching current	min. 10 µA max. 3 A AC, 1 A DC
Breaking capacitance	max. 500 VA, 54 W
Min. switching hysteresis (Low-/High delta)	0.5 %

DISBUS output

Function	for linking the signal conditioning instruments and for connection of digital indicating instruments
Connection cable	2-wire standard cable (screening is recommended)
max. cable length	1000 m

Indicating elements

Clear text indication (not available with VEGAMET 514N)	LC display - 4-line, 6 digits each - background lighting
Analogue indication (not available with VEGAMET 514N)	LED chain consisting of: - 11 segments 0 % ... 100 % - shows the actual value of the measurement loop
LEDs in front plate	green: operating voltage on red: fault signal (LED lights with deenergised relay) yellow: relay status (standard setting: LED lights with energised relay)

Adjustment elements

Front plate	6 keys for configuration and parameter adjustment (not available with VEGAMET 514N)
Circuit board	rotary switch for adjustment of the instrument address on DISBUS

Ambient conditions

Permissible ambient temperature	-20°C ... +60°C
Storage and transport temperature	-40°C ... +80°C

Electrical connection

Multiple plug component	acc. to DIN 41 612, series F, 33-pole, 3 lines d, b, z (partly equipped)
Carrier BGT 596 (Ex)	connection to the appropriate module
Housing type 505	connection to screw terminals (max. 2.5 mm^2)

Electrical protective measures

Protection	
- unassembled	IP 00
- mounted into carrier BGT 596	
- front side completely equipped	IP 40
- upper and lower side	IP 20
- wiring side	IP 00
- mounted into housing type 505 or type 506	
- terminal side	IP 20
- housing general	IP 30
Protection class	II (in housing type 505)
Overvoltage category	II

Electrical separating measures

Reliable separation acc. to VDE 0106, part 1 between	power supply, fail safe and level relay and measuring data inputs
- reference voltage	250 V
- isolation resistance	2.3 kV
Galvanic isolation	between the relay outputs
- reference voltage	250 V
- isolation resistance	1.4 kV
Potential separation	between DISBUS and outputs
- reference voltage	50 V
- isolation resistance	0.5 kV
Common reference potential at	voltage and current output, correction signal output

Mechanical data

Series	module unit for carrier BGT 596 or housing type 505
Dimensions	B = 25.4 mm (5 TE), H = 128.4 mm, T = 162 mm

CE conformity CE

VEGAMET 514 and VEGAMET 514 Ex signal conditioning instruments meet the protective regulations of EMC (89/336/EWG) and NSR (73/23/EWG). Conformity has been judged acc. to the following standards:

EMC	Susceptibility	EN 50 081 - 2: 1993
	Immission	EN 50 082 - 2: 1995
NSR		EN 61 010 - 1: 1993

Ex technical data

Power supply

Operating voltage	U_{nom} corresponds to non-Ex version
Reference voltage	U_m = 250 V AC or 125 V DC

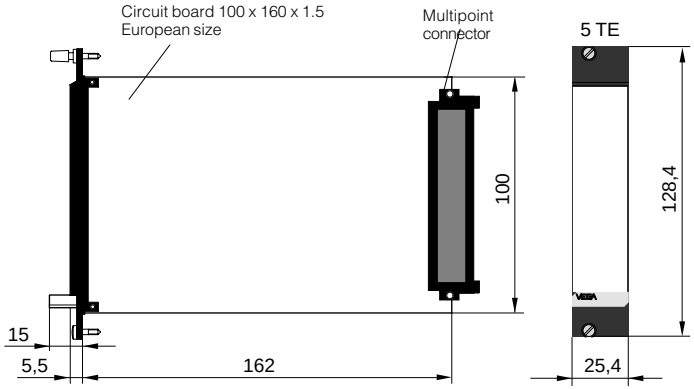
Meas. data input (intrinsically safe circuit) on VEGAMET 513 Ex 2-times available

Flame proofing	[EEx ia] IIC, [EEx ia] IIB, [EEx ib] IIC or [EEx ib] IIB
Max. values	
- voltage	U_O = 20 V
- current	I_O = 128 mA
- power	P_O = 640 mW
Characteristics	linear
Effective inner inductance L_I	negligible
Effective inner capacitance C_I	negligible

	EEx ia IIC			EEx ia IIB	EEx ib IIC	EEx ib IIB
Max. permissible outer inductance L_O (mH)	0.5	1	1.5	2	2	9
Max. permissible outer capacitance C_O (nF)	97	78	68	486	200	1000

The intrinsically safe circuits are reliably separated from the non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V. The max. voltage on the non-intrinsically safe circuits should not exceed 250 V_{eff} in case of failure.

1.5 Dimensions



2 Mounting

VEGAMET 514 signal conditioning instruments can be either mounted with a module in a carrier BGT 596 or BGT 596 Ex.M or in a single housing type 505.

Mounting in carrier

Mount the respective module (standard or Ex version) in your carrier. Wire the terminals of the multipoint connector according to the wiring plan.

Module

Multipoint connector DIN 41 612, series F, 33-pole (d, b, z) with coded pins and mounting material for mounting in carrier BGT 596 or BGT 596 Ex.M.

Module Ex

Multipoint connector DIN 41 612, series F, 33-pole (d, b, z) with coded pins, Ex separating chamber and mounting material for mounting in carrier BGT 596 Ex.M.

The multipoint connector is available in the following versions:

- Wire-Wrap standard connection 1.0 x 1.0 mm
- Plug connection 2.8 x 0.8 mm
- Termi-Point standard connection 1.6 x 0.8 mm
- Soldering connection
- Screw terminals 2 x 0.5 mm^2

For further mounting information, see the operating instructions of the carrier.

Mounting in single housing

Either screw the housing socket directly to the mounting plate or plug it onto a carrier rail (35 x 15 acc. to EN 50 022 or 32 acc. to EN 50 035). Connect the terminals according to the wiring plans on the following pages. For further mounting information see the operating instructions of the housing.

Transparent cover

To protect the instrument against unauthorised adjustment, the front plate of VEGAMET can be provided with a lockable transparent cover (supplied with the instrment).

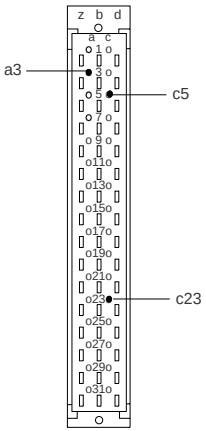
Coding

To prevent an interchanging of the different signal conditioning instruments, the multipoint connector of carrier or the housing can be provided with coded pins.

Note:
The coding is absolutely necessary for Ex instruments!

The multiple plug of the signal conditioning instrument is equipped with respective holes (mechanical coding). Instrument coding ensures that the different signal conditioning instruments cannot be interchanged. The appropriate coded pins are supplied with each module or housing. Equip the multipoint connector with these coded pins acc. to the following table.

	Instrument coding	Ex coding
VEGAMET 514	a3 / c5	––
VEGAMET 514 Ex	a3 / c5	c23



3 Electrical connection

3.1 Connection instructions

Note the following instructions for electrical connection:

- The connection must be made acc. to the local installation standards (e.g. in Germany acc. to the VDE-regulations).
- The wiring between VEGAMET and sensor can be done with standard two-wire cable.
- If strong electromagnetic interferences are expected, screened cable is recommended. The screening must be earthed on both ends.
- The line resistances stated in the technical data must not be exceeded.
- If overvoltages are expected, we recommend a sensor electronics with integrated overvoltage protection or the installation of VEGA overvoltage arresters.
- The voltage supply of VEGAMET must provide with extra-low voltage to ensure protection class II. When using VEGASTAB 593 a reliable separation from the mains circuits acc. to DIN VDE 0106, part 101 is ensured.

3.2 Connection instructions for Ex approved applications

The signal conditioning instruments must be generally mounted outside the hazardous areas, or special Ex protective measures must be taken.

Ex separating chamber

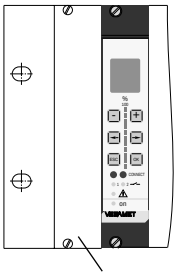
To ensure sufficient "air and creep distance", an Ex separating chamber must be mounted to the connections of VEGAMET. Lead the cables through the Ex separating chamber and connect them. Fasten the Ex separating chamber with the lower screw. Note the operating instructions of the carrier BGT 596 Ex.M.

Protection in Ex applications

In Ex applications a protection class of IP 20 must be maintained. To accomplish this, cover the gaps or free modules from the front with suitable blind covers.

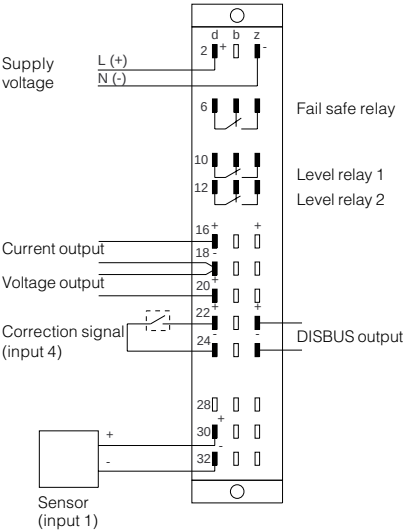
Mounting in carriers

If you mount your VEGAMET with Ex approval in a carrier, you have to use a VEGA-Ex module. Keep a distance of at least 10 mm (2 TE) to module cards of other manufacturers. If you want to mount VEGAMET at the utmost left position in the carrier, you have to mount a blind cover with at least 20 mm (4 TE) in front of the module of the instrument.



Blind cover (4 TE)

3.3 Wiring plan



Ex version

For connection of Ex certified instruments, please note the instructions in the attached official documents as well as the valid mounting regulations. Make sure that the Ex separating chamber is mounted to the multipoint connector. Always lead the cables through the Ex separating chamber. Also note the operating instructions of the carrier BGT 596 Ex.M and the Ex instructions.

4 Adjustment

4.1 Indicating and adjustment elements

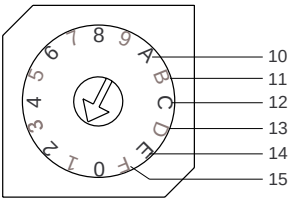
Circuit board

A rotary switch is located on the circuit board. It is used for adjustment of the instrument address on DISBUS. This setting is necessary if several VEGAMET signal conditioning instruments are linked via the DISBUS or if you control a VEGADIS 174 indicating instrument via the DISBUS.

The adjustment range 1 … F corresponds to the DISBUS addresses 1 … 15.
Factory setting: 1

Note:
With address 0 the VEGAMET does not participate in the DISBUS communication.

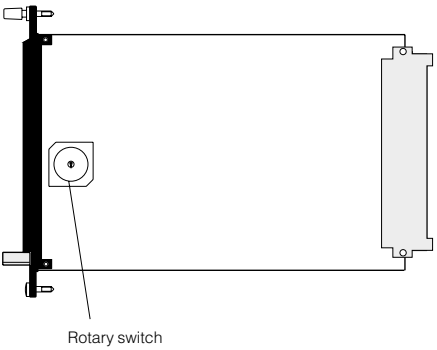
Rotary switch



The set instrument address on the DISBUS can be indicated via the LC display.

Note
If several VEGAMET are linked via the DISBUS, each address must only be assigned once!

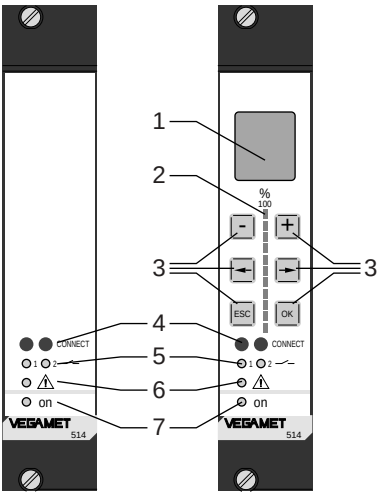
Position of the rotary switch



Front plate VEGAMET 514

without adjustment module

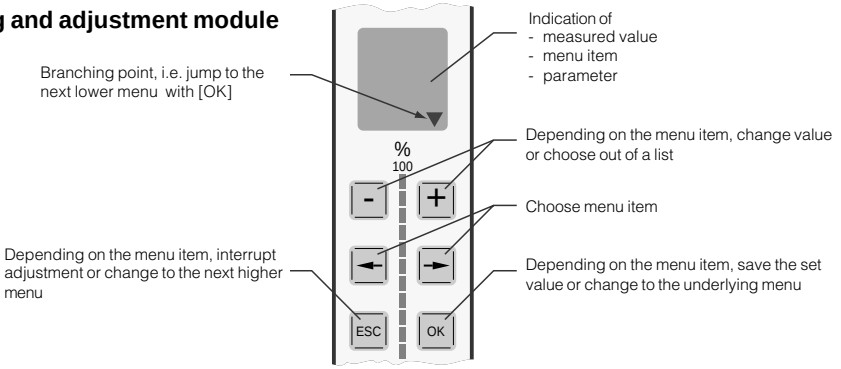
with adjustment module



1 LCD (4 lines with 6 figures each, illuminated) for clear text indication
2 LED chain (yellow) for quasi-analogue indication of the measured value
3 Keys for menu adjustment
4 Connection socket for VEGACONNECT
5 LED (yellow) lights if the relay is energised (standard setting)
6 LED (red), lights if fail safe relay is deenergised
7 LED (green), lights if operating voltage is on

4.2 Adjustment system

Indicating and adjustment module


Branching point, i.e. jump to the next lower menu with [OK]
Indication of
- measured value
- menu item
- parameter
%
100
Depending on the menu item, change value or choose out of a list
Choose menu item
Depending on the menu item, interrupt adjustment or change to the next higher menu
Depending on the menu item, save the set value or change to the underlying menu
-
+
ESC
OK

Reduced menu - extended menu

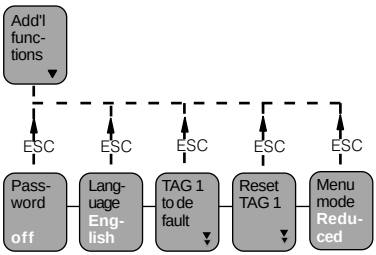
Two menu modes are available: the mode "reduced menu" and the mode "extended menu".

Note:
VEGAMET 514 is preset to automatically place in the menu mode "reduced menu"!

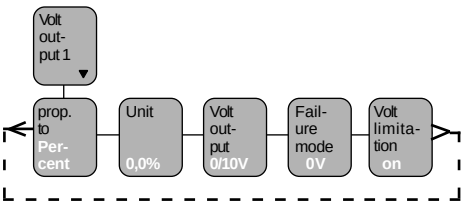
In the majority of all applications, you can carry out the necessary settings in this menu mode (see also chapter 4.5 Comparison of the menu modes).

Adjustment structure

The adjustment is made via 6 keys in conjunction with the text display. The jump from the measured value display to the underlying menu is made with [OK]. Use [–>] or [<–] to change within this menu level from one menu item to the other. A branching point is indicated by the symbol ▼ and enables with [OK] a jump to the underlying menu item. Parameters can be recognised by the absence of the symbol ▼. The value of the parameters can be modified with [+] or [–] or chosen out of a list. The modified value can be saved with [OK]. To interrupt a setting (without saving the modification), you have to push [ESC]. A jump back to the next higher menu item is made with [ESC]. 15 minutes after pushing a key for the last time, an automatic reset to the measured value display is triggered. A jump back to the next higher menu level with [ESC] is possible from each menu item , even if no connecting line is shown in the menu schematics.



If you are in the utmost right menu item of a menu row and push the [➔] key, you will immediately reach the utmost left menu item of this row. You also reach immediately the right menu item from the left one, if you push the [➔] key.
These shortcuts (shown with a broken line) are not shown in the menu schematics in order to give a better overview.



Format examples of the menu schematic

In white letters you see the parameters which can be modified with the [+] or [–] key and saved with the [OK] key.

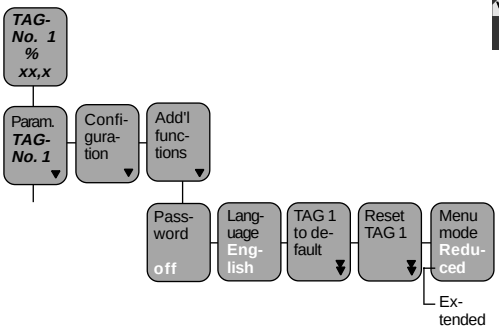
Examples:
- In the menu item "Language" you can change from German to English.

Bold print/italic entries, e.g. the measurement loop name "TAG-No. 1" can differ if you have made a corresponding parameter adjustment or configuration of the measurement loop. In the menu schematics you will see the factory settings.

Light grey menu items are only displayed if necessary (depending on the adjustments made in the other menu items).

Change of the menu mode:

Move from the display of measured value (TAG-No.1) to the menu item "Menu mode reduced". Now push [+] twice until "Menu mode Extended" appears, then push [OK].



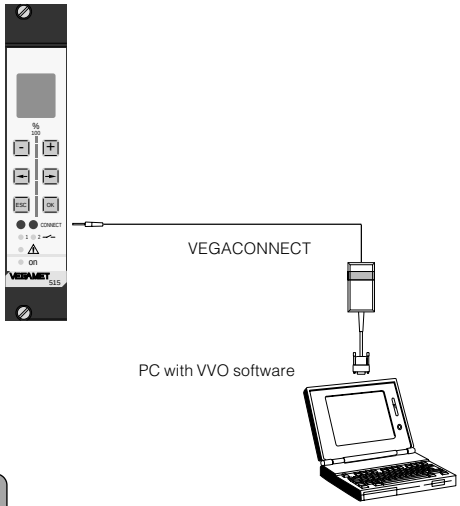
4.3 Adjustment via PC

Signal conditioning instrument with adjustment module

Setup
- directly via the keys of the adjustment module
- or with a PC, equipped with VVO software (VEGA Visual Operating) and an interface adapter VEGACONNECT.

Signal conditioning instrument without adjustment module

Setup
- with a PC, equipped with VVO software (VEGA Visual Operating) and an interface adapter VEGACONNECT.



4.4 Configuration and parameter adjustment

Independent of whether you set up your VEGAMET via the keys of the adjustment module or via a PC with the software VVO, the procedure is always the same.

Proceed in the following sequence:
- configuration (if not already configured as factory setting)
- parameter adjustment.

In this operating instruction manual, the adjustment steps are described which are directly carried out on the keys of VEGAMET. The adjustment via the software VVO is described in a separate manual.

Configuration
Configuring means assigning or setting (once) function. VEGAMET requires a (mostly once) basic co-ordination, determining the applications and the assignments of the inputs and outputs. Choices can be made from existing functions and options. This procedure is called configuration. The signal conditioning instruments are delivered with a configuration which only needs to be changed in special cases.

The basic configuration includes the following steps:

1 Configuration measurement loop
- Choose the kind of application (level, gauge…)
- Choose sensor type (capacitive, hydrostatic…)
- Specify application (standard, level difference…)
- Determine options (no option, corrections…)

Note:
The measurement loop configuration can only be modified if a "Reset to single measurement" has been carried out previosly (under "Additional functions" in the extended menu). If you only want to modify the sensor type, you first have to carry out "Reset TAG 1" (under "Additional functions" in the reduced menu).

2 Configuration, inputs
- Determine from where your VEGAMET receives the input data (sensor, other VEGAMET)
- Enter sensor characteristics values (meas. range, current range)

3 Configuration, outputs
- All outputs (except fail-safe relay) can be assigned to a sensor or can be switched off.

After basic configuration, VEGAMET starts operating and indicates the actual measured value. The other configurations should be carried out after the parameter adjustment.

Parameter adjustment
Parameter adjustment means changing the values. Signal conditioning instruments have many parameters, the values of which can be modified, such as for example the integration time of 0 … 600 s. The modification of these values is called parameter adjustment. The parameter adjustment does not influence the configuration. Take notice that parameter adjustment is only possible after a configuration has been done (e.g. set values of the current input when the current output has been assigned).

4.5 Comparison: reduced menu – extended menu

In the table the most important functions of VEGAMET 514 are listed – each with a mark indicating in which menu mode the functions are available.

Function	Reduc. menu	Ext. menu
Adjustment with medium	x	x
Adjustment without medium	x	x
Set integration time	x	x
Simulation	x	x
Switch over current output (4/20 mA, 0/20 mA, 20/4 mA, 20/0 mA)	x	x
Switch over voltage output (2/10 V, 0/10 V, 10/2 V, 10/0 V)	x	x
Changeover relay mode (overfill protection – dry run protection)	x	x
Scaling (display)	x	x
Change menu mode (reduced – extended)	x	x
Change menu language	x	x
Activate/deactivate password	x	x
Change sensor type	x	x
Change measurement loop name	x	x
Reset measurement loop (Reset TAG)	x	x
Reset measurement loop to default (TAG to default)	x	x
Use correction input	–	x
Edit linearisation curves	–	x
Change mode (e.g. level – gauge)	–	x
Select different reference values for outputs	–	x
Define output behaviour (current/voltage output) in case of failure	–	x
Adapt VEGAMET to sensor characteristics values	–	x
Offset correction during adjustment	–	x
Adjust relay switching delay	–	x
Reset level	–	x
Assign inputs (from another VEGAMET)	–	x
Switch on/off current/voltage limitation	–	x
Individual setting of current/voltage output values between 0 … 20 mA/0 … 10 V	–	x
Manual offset correction	–	x
Manual real value correction	–	x
Info indication	–	x

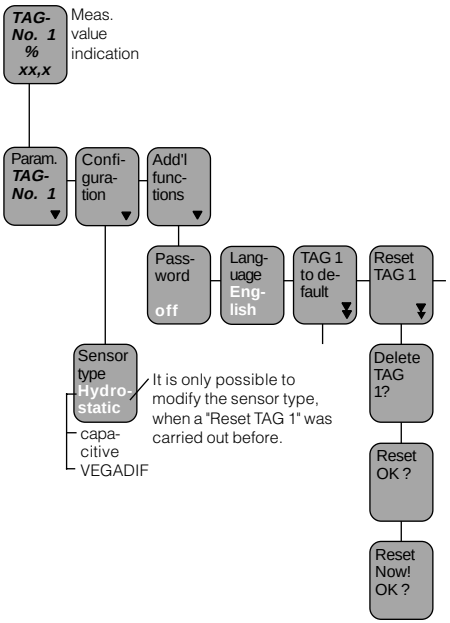
5 Setup

- Adjust the VEGAMET instrument address on the circuit board by means of the rotary switch (only necessary, if several VEGAMET are connected by means of DISBUS).
- Install VEGAMET.
- Connect sensor and power supply.
- After switching on, the display indicates for approx. 10 secs the instrument type and the software version, e.g. "MET 514 V1.12".
- If a measurement loop has not yet been configured, the display shows "Configuration", the red failure LED also lights. In this case, proceed as described under "6.1 Configuration of measurement loop".
- If a measurement loop is already configured, the display shows a value, e.g. "TAG-No. 1 21.8 %".You can now carry out the settings, as described in the chapter "6 Settings in the reduced menu".

6 Settings in the "reduced menu"

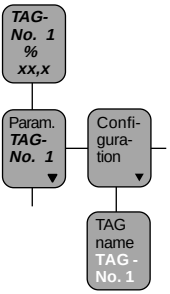
6.1 Configuration of measurement loop

Choose sensor type



By default, VEGAMET 514 is configured for connection to a hydrostatic sensor. If, for example, you use a capacitive electrode, you have to proceed as follows:
Move to the menu item "Sensor type Hydrostatic".
Push [+] or [–] once. The word "Hydrostatic" flashes. You are now in the editing mode.
Continue pushing [+] or [–] until the display shows "Sensor type capacitive". You are still in the editing mode.
Now push the [OK] key. By doing this, you save the settings and quit the editing mode.

Name measurement loop



You can modify the measurement loop name "TAG-No. 1", if you want a more useful designation.
Two lines with six figures each are available. To do this, move to the menu item "TAG name …".

Push [+] or [–] once. The first character of the measurement loop name, in this example the letter T, flashes (editing mode). Continue pushing the [+] or [–] key, by doing this you scroll through the alphabet, through the row of numbers and through a list of characters.

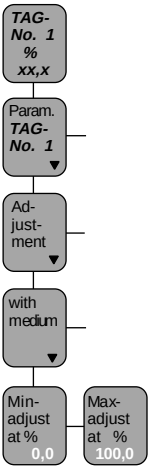
When you have reached the requested character, push [–>]. The next character is activated and begins flashing. Scroll again with [+] and [–] to the requested character. With [–>] you again move to the next character.

When you have finished the last position of the name and you have "written" the name of the measurement loop in this way, you have to push [OK] to save the setting. If you quit the menu item without saving, the name of the measurement loop is again "TAG-No. 1".

In the display of measured value and all other menu items in which the measurement loop name is shown, you will now see the new designation.

6.2 Adjustment with medium

You can either carry out the adjustment **with** medium or **without** medium. Adjustment with medium means that you carry out the adjustment taking the actual level into account. To carry out an adjustment with medium, it is necessary to know the percentage value of the actual vessel filling.



In this procedure, the percentage values which correspond to the actual min. and max fillings are entered. The adjustment sequence of the min. and max. value is unimportant. When you know, for example, that your filling is actually 80 %, you can enter in the menu max. adjustment the value "80". Later when your filling is, for example, 10 %, you enter in the menu min. adjustment the value "10".

The bigger the difference between the two adjustment points, the more precise the measurement over the whole measuring curve. An adjustment at 0 % and 100 % would be ideal. For practical reasons, it is not always possible to completely empty or fill a vessel. The distance between the two adjustment points, however, should be at least 10 % of the sensor range.

Adjustment example

You know that your vessel is actually filled up to 80%. Move to the menu item "Max. adjust at % 100.0". Push the [–] key briefly, so that the figure 100.0 flashes (editing mode).

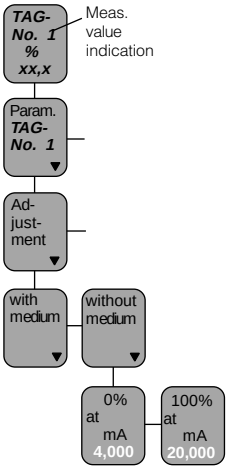
Continue pushing [–] until the figure 80.0 appears on the display. Now push [OK] to save the adjustment.

Later, when your filling is, for example, 10 %, go to the menu item "Min. adjust at % 0.0". Briefly push [+], until the figure 0.0 flashes (editing mode).

Continue pushing [+] until "10" appears on the display. Now push [OK] to save the adjustment.

You can of course carry out the adjustment with medium at 0 % and 100 % filling. Note: The figures 0 % and 100 % must flash (editing mode), before they can be saved with the [OK] key.

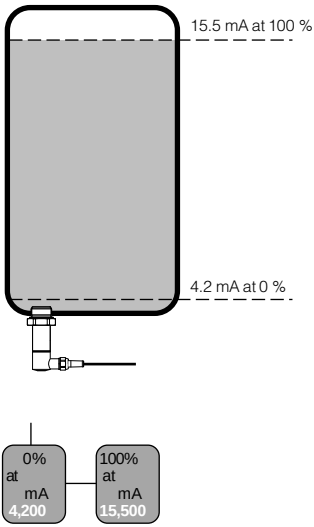
6.3 Adjustment without medium



For this adjustment procedure you have to enter two sensor current values (4 ... 20 mA) corresponding to the levels 0 % and 100 %.

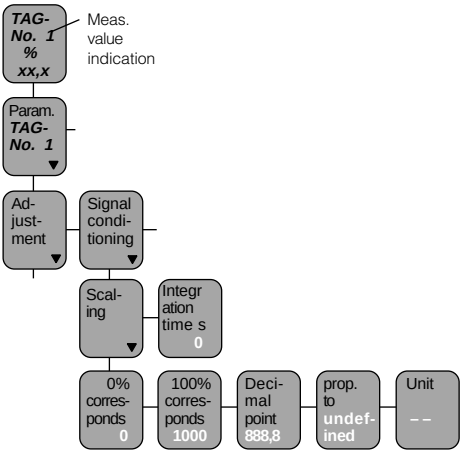
Adjustment example

You know the data of the sensor, i.e. you know that at 0 % filling the sensor delivers a current of 4.2 mA and at 100 % filling a current of 15.5 mA. Enter these values in the menu items.



Enter in these two menu items the values of the senor. Use the [+] and [–] keys to set the values and [OK] to save the values.

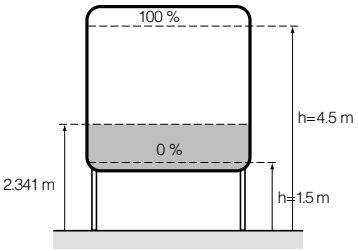
6.4 Scaling



The adjustments under scaling determine which number values and which unit will be actually displayed in the measured value indication (upper menu item). In the menu items "0 % corresponds…" and "100 % corresponds…" you can enter with [+] or [–] and [OK] values which should be displayed at 0 % and at 100 % filling. In the menu item "Decimal point…" you determine the position of the decimal point. In the next menu item "prop. to…" you can select from a list of parameters: percent, mass, volume, pressure etc. by pushing [+] or [–] and saving with [OK]. According to this adjustment, the menu item "Unit…" provides a new choice, e.g. m, dm, cm, mm, ft, yd and in, if you have selected the parameter "Height" (compare chapter "8 Measured quantity and units").

Scaling example

You have a raised tank and you want the level to be indicated in meters with three digits after the decimal point.



0% corres-ponds 1500 — Set the number 1500 (with keys [+], [–] and [OK]) in this menu item. This corresponds to the level at 0 % (if you want to have a lower resolution of the meas. value indication, you can also set to 150 or 15).

100% corres-ponds 4500 — Set the number 4500 (with keys [+], [–] and [OK]) in this menu item. This corresponds to the level at 100 %.

Deci-mal point 8,888 — Adjust the decimal point as shown (with keys [+], [–] and [OK]).

prop. to Height — Choose the term "Height" in this menu item (with keys [+], [–] and [OK]).

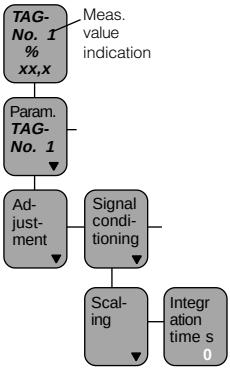
- Percent
- Pressure
- Mass

Unit m — Because you have chosen "Height" in the previous menu item, you get a choice of several units (mm, dm, cm, m, yard…). Choose m (with the keys [+], [–] and [OK]).

- dm
- cm
- ....

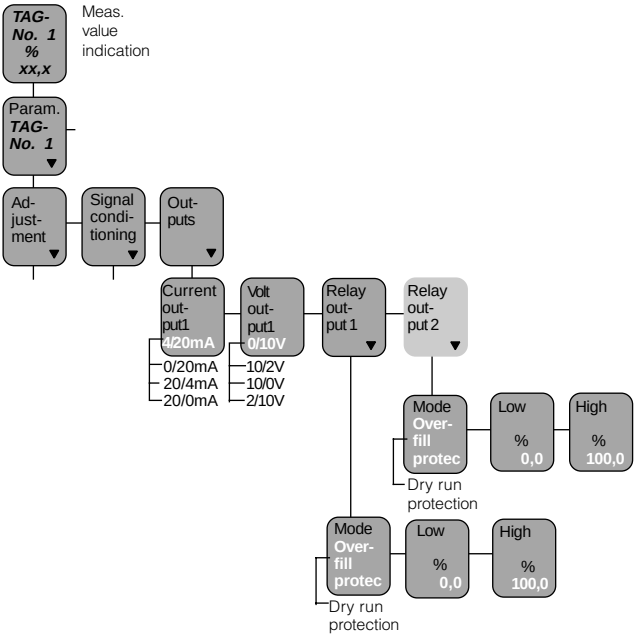
TAG - No. 1 *m* *2,341* — In the meas. value indication the scaled value is shown.

6.5 Integration time



If the integration time is set to 0 s (factory setting), each quick change of the product surface (e.g. waves) will be immediately detected and interpreted as level change. All output values of VEGAMET will react immediately to the wave movements. To avoid this, the integration time can be increased (max.
600 s are possible with VEGAMET). The higher the time adjustment, the slower the measurement reacts.

6.6 Output



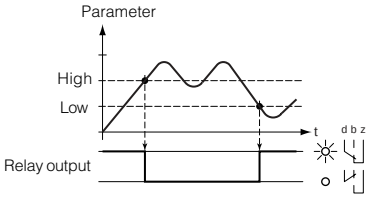
The current output of VEGAMET is set to 4 … 20 mA. By pushing [+] or [–] and [OK] you can set the output to the following values: 0/20 mA, 20/4 mA and 20/0 mA.

Beside the preadjustment (0/10 V), the following options are available for the voltage output: 10/2 V, 10/0 V and 2/10 V.

As a factory setting, the relay outputs are set to mode "Overfill protection" (mode A). By pushing [+] or [–] and [OK] you can assign the mode "Dry run protection" (mode B) separately for each relay output. In the next menu items you can determine the upper and lower switching points for the set mode.

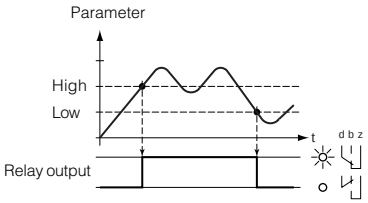
The graphics on the following page show the behaviour of the relay outputs and LEDs depending on the level.

Overfill protection



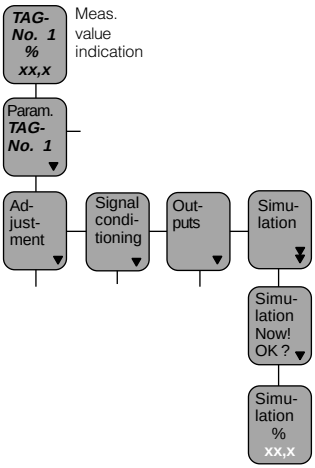
The relay of relay output 1 deenergises at switching point "High" (safe switching condition).

Dry run protection



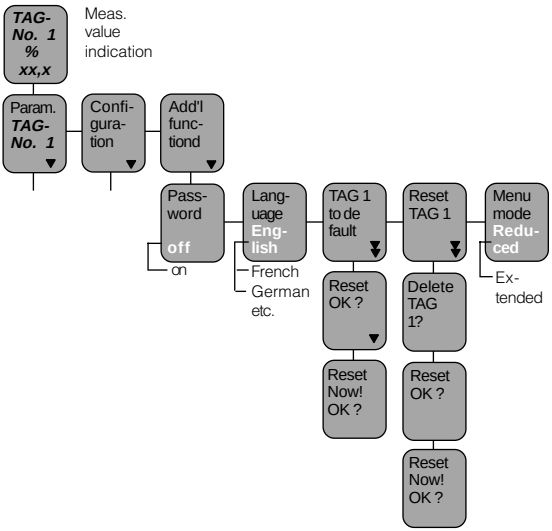
The relay of relay output 1 deenergises at switching point "Low" (safe switching condition).

6.7 Simulation



To check outputs and connected instruments, you can adjust any individual percentage value with the keys [+] and [–] in this menu item. Initial point is always the actual measured value. The indicated value flashes when simulation is activated. 15 minutes after setting the simulated value, the simulation automatically terminates and resets to meas. value indication.

6.8 Password, language, default, reset, menu mode



Password

You have the possibility to protect VEGAMET 514 against unauthorised adjustment or adjustment by mistake. Activate in the menu "Password" the option "on" (with keys [+], [–] and [OK]). Now you can only check the meas. value on the display. You can still reach any menu item with the arrow and OK keys, but as soon as you want to modify an adjustment, you are asked for the password. Enter the figure "513" (with the keys [+], [–] and [OK]), to carry out the adjustment. One single input of the password is sufficient to open all protected menu items.

Language

In the menu item "Language" you can choose a language other than German such as English, French etc. as menu language (with keys [+], [–] and [OK]).

Default

In the menu item "TAG 1 to default" you reset all settings concerning measurement loop 1 to default. If, for example, you have changed the name of the measurement loop to "Silo 5", after the reset the name is again "TAG-No. 1". Also all adjustment values that you have entered for measurement loop 1 are now reset to default.

Reset TAG 1

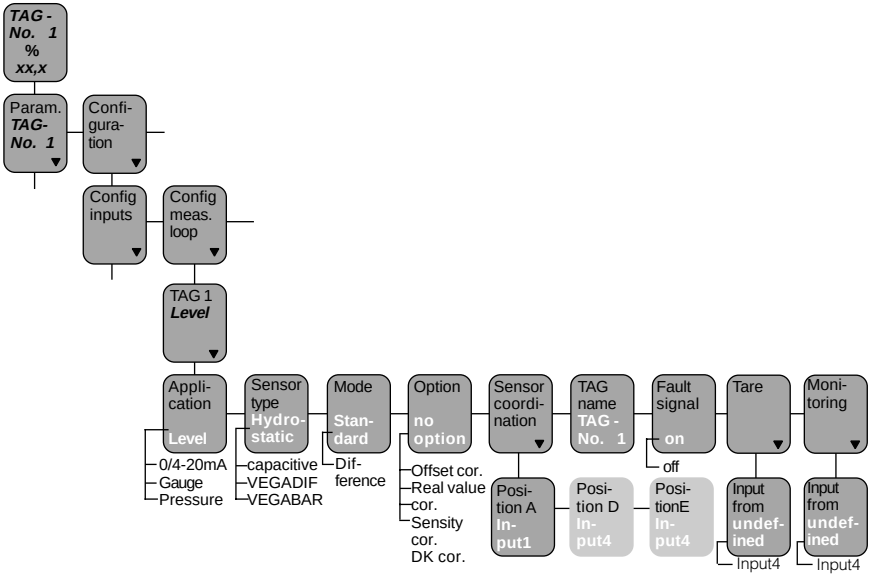
With "Reset TAG 1" the measurement loop configuration will be deleted. This function must be carried out if you want to change the applied measuring technology (e.g. capacitive instead of hydrostatic).

Menu mode

The menu modes "Reduced" and "Extended" are available. With the keys [+], [–] and [OK] you choose the required menu mode. The menu schematics of the reduced menu and the extended menu are shown later in this operating instruction manual. The factory setting is "Reduced menu".

7 Settings in the "extended menu"

7.1 Configuration of measurement loop



The measurement loop configuration is normally already done at the factory. Should a fundamental modification of the measurement loop configuration be necessary, a "Reset to single measurement" must first be carried out (in the menu "Additional functions", "Reset VEGAMET"). Only then can you modify the adjustments in the menu items Application, Sensor type, Mode and Option. You should, therefore, work on the individual menu items in the given sequence. The selection or adjustment possibilities always depend on the adjustment in the previous menu item. If, for example, in the menu item Application "Level" is adjusted, the sensor mode that is suitable for level detection can be selected in the menu item "Sensor type".
As soon as you have carried out and confirmed an adjustment in the menu item "Option", the following message appears on the display "TAG being created!".

You choose the application 4/20 mA when you want to connect a sensor of another manufacturer to the VEGAMET.

In the following illustrations, further application modes are shown. In addition, you will see there which adjustments you have to carry out in the menu items "Sensor type" and "Mode".

The menu item "Position D" only appears if in the menu item "Option" either "Offset correction" or "Real value correction" has been set. The menu item "Position E" only appears if in the menu item "Option" either "Density correction" or "DK correction" has been set.

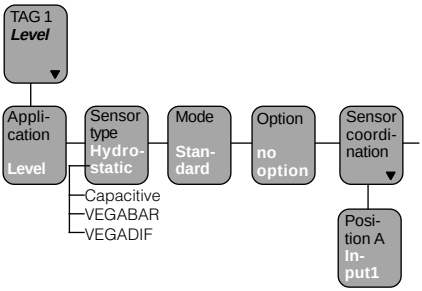
In the menu items "Pos. D" and "Pos. E" you can specify if input 4 is to used for one of the stated correction modes (input 4 is the correction signal input on terminals 22d and 24d). You then have to enter a value at which the correction should be carried out under "Parameter adjustment" — "Special funct." in the menu items "Real value correc. at..." or "Density correc. at...".

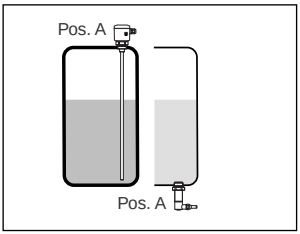
Note!
Input 4 can also be used for Tare and Monitoring. However, it is not possible to use it at the same time for taring, monitoring and, for example, density correction!

In the menu item "TAG name" you can assign an individual name to the measurement loop.

If you choose "Fault signal off", the fail-safe relay and the failure LED on the front plate will be nonoperable. For a description of the correction modes, see the following pages.

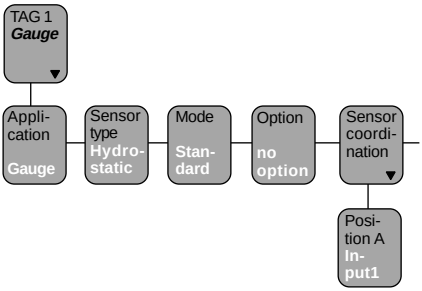
Level measurement

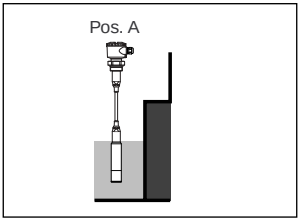




Level measurement

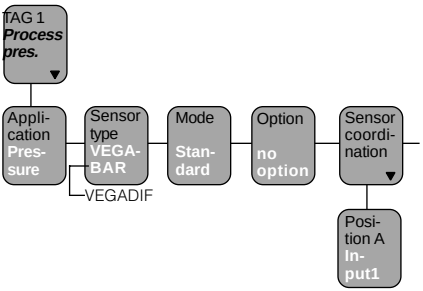
Gauge measurement

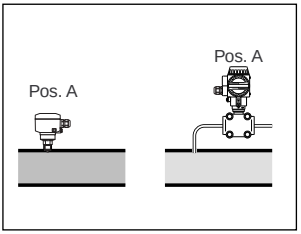




Gauge measurement

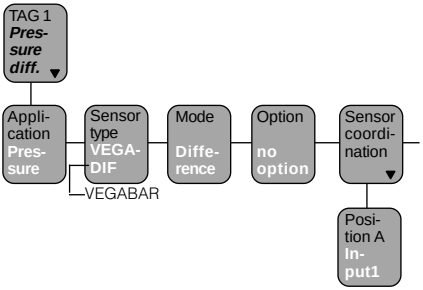
Process pressure measurement

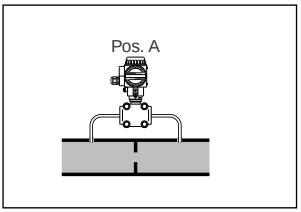




Process pressure measurement

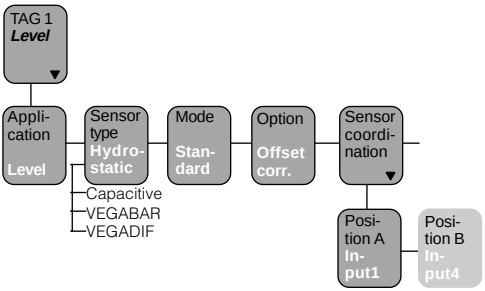
Differential pressure measurement

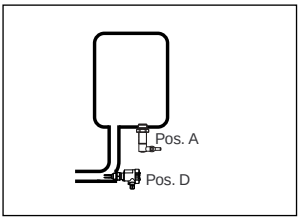




Differential pressure measurement

Level measurement with offset correction

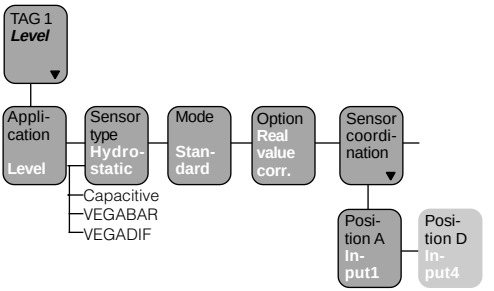


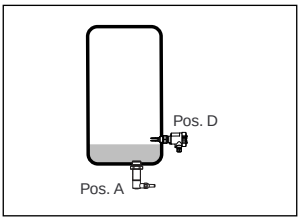


Level measurement with offset correction

Pos. A: Continuous sensor to input 1
Pos. D, Pos. E: Level switch to input 4 (correction input)

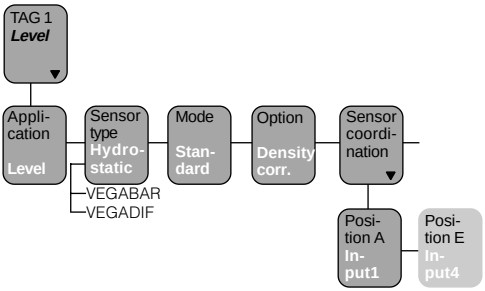
Level measurement with real value correction

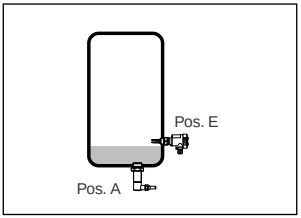




Level measurement with real value correction

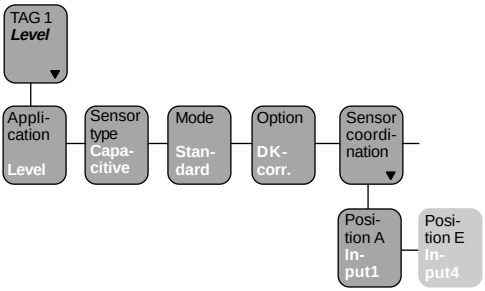
Level measurement with density correction

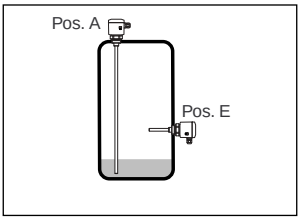




Level measurement with density correction

Level measurement with DK correction

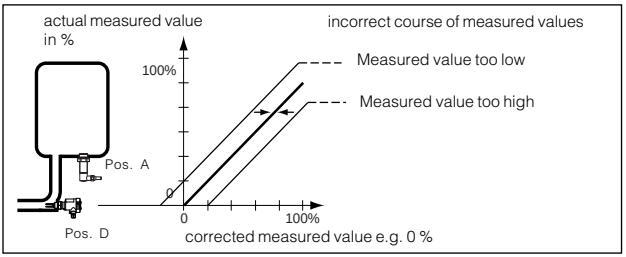




Level measurement with DK correction

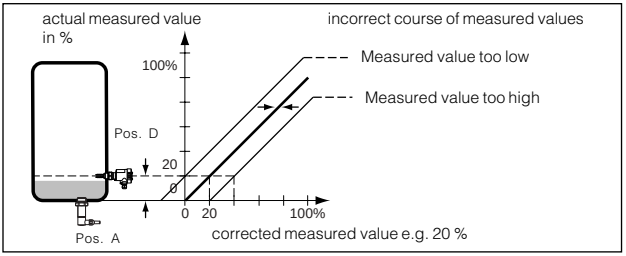
Pos. A: Continuous sensor to input 1
Pos. D, Pos. E: Level switch to input 4 (correction input)

Offset correction
- with unpressurized sensor
- parallel shift of the adjustement characteristics



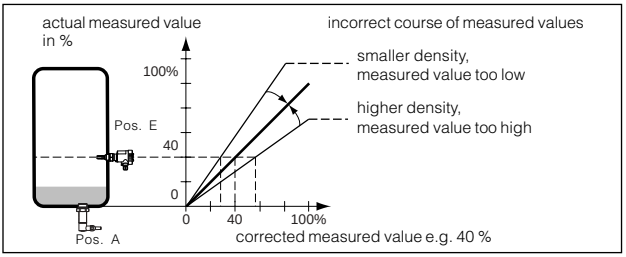
Offset correction

Real value correction
- with a given percentage value
- parallel shift of the adjustement characteristics



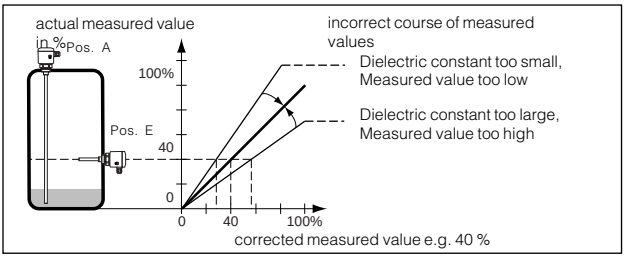
Real value correction

Density correction
- only in conjunction with hydrostatic pressure transmitters
- slope correction of the adjustment characteristics



Density correction

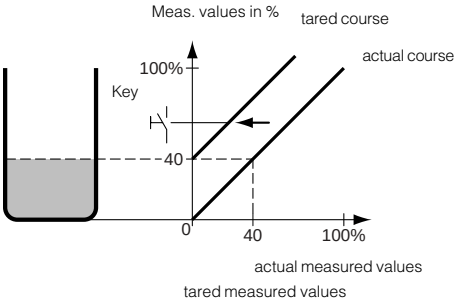
DK-correction
- ε_r-correction
- only in conjunction with capacitive measuring probes
- slope correction of the adjustment characteristics



DK-correction

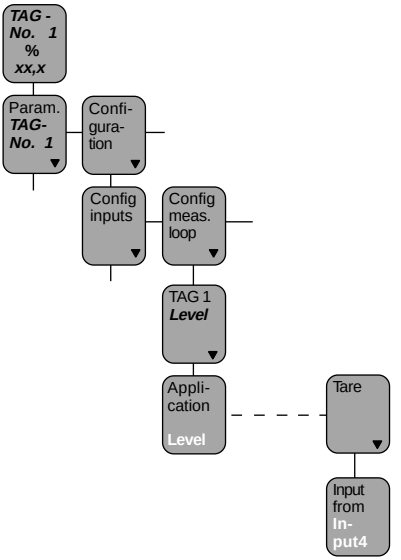
7.2 Tare

With the function "Tare" a measured value beginning at 0 % is created from the actual measured value. The tare function can be started via a key connected to correction signal input 4.

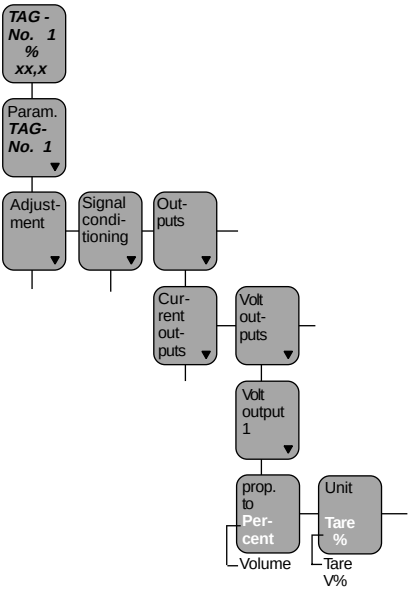


The following steps are necessary to activate the tare:

- Connect a key (closer) to input 4.



- Choose in the menu item "**Input from**" (under the menu item "**Tare**") input 4.

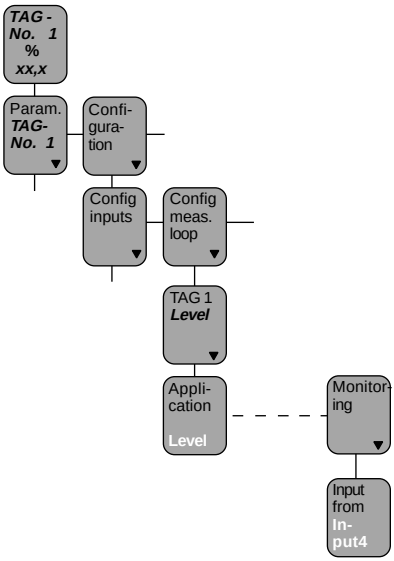


- Assign the tared values in the menu item "**Unit**" to the requested output (e.g. current, volt, DIS, PC/DCS output, MET indication).

If you want to delete the tare function, you first have to cancel the tare in the menu item "**Unit**". Then you have to cancel the allocation of the correction input (input 4) under the menu item "**Tare**".

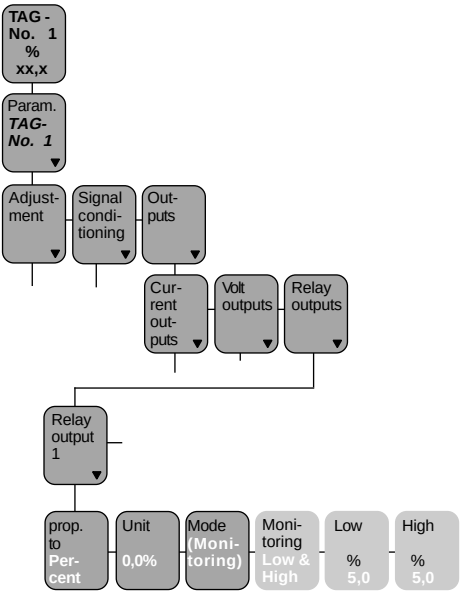
7.3 Monitoring

To activate monitoring, the following prerequirements must be met:



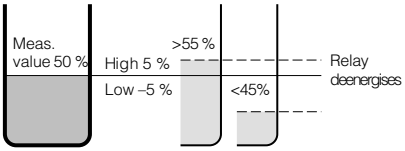
- Choose in the menu item "**Input from**" (under the menu item "**Monitoring**") input 4.

- Connect a key switch (opener) to input 4.



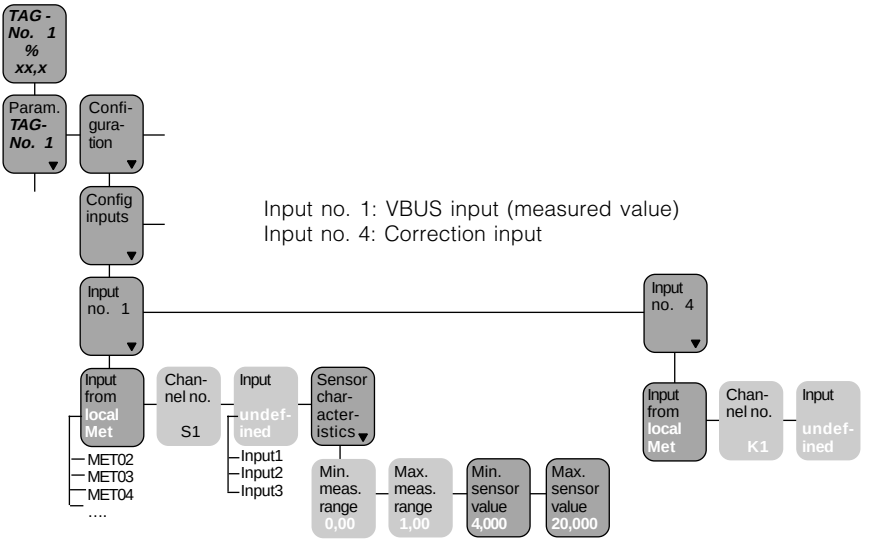
- Choose in the menu range "**Parameter adjustment relay outputs**" in the menu item "**Mode**" the mode "**Monitoring**" for the selected relay.

The selected relay becomes energised. By pushing the key switch (opener opens), the actual measured value is first of all frozen and, derived from this, the relay deenergises if this value is underrun (Low) or exceeded (High). After a reset and a repeated pushing of the keyswitch, the actual measured value is again frozen.



If the monitoring function should be cancelled, first of all the monitoring must be cancelled in the menu item "**Mode**". Then the allocation of the correction input (input 4) must be cancelled under the menu item "**Monitoring**".

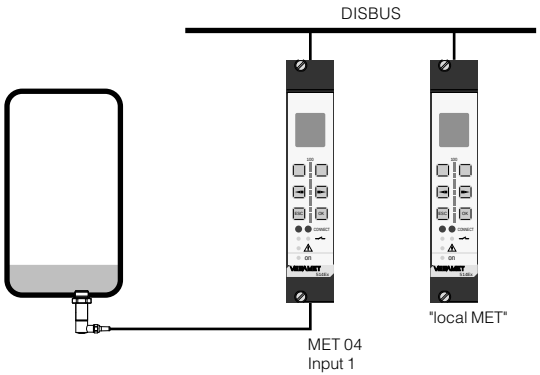
7.4 Configuration of inputs



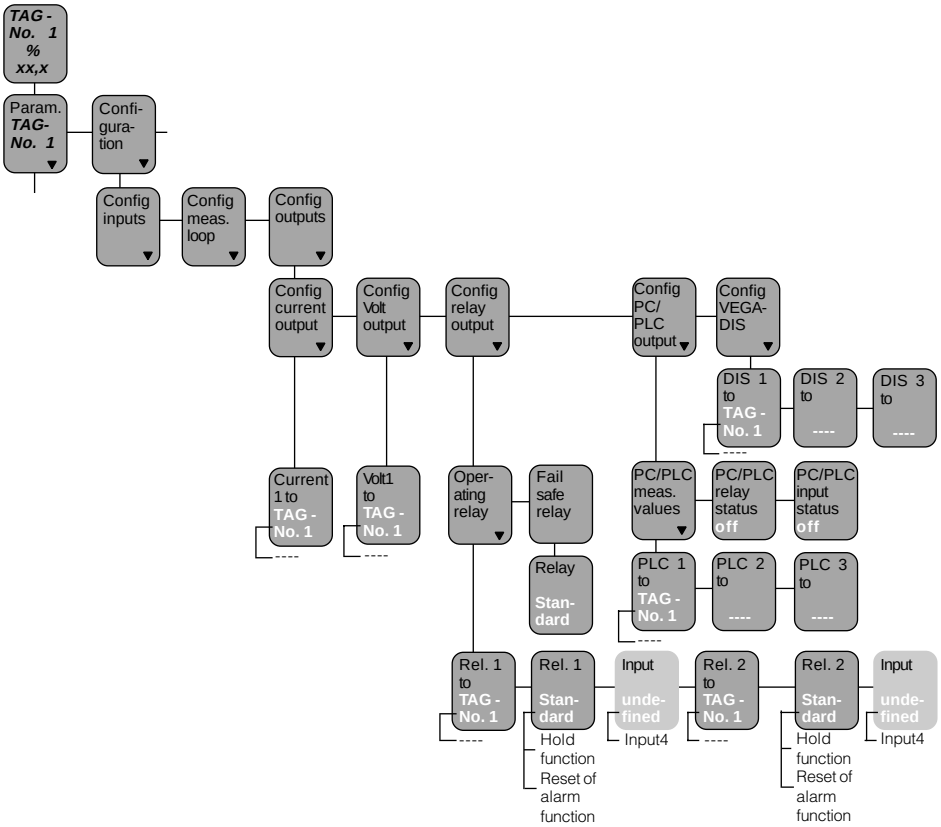
Input local MET:
Here you can select another VEGAMET (e.g. Met 04) and hence determine that the input signal should not be taken from a directly connected sensor, but from a VEGAMET connected over the DISBUS (e.g. VEGAMET 514). The selected VEGAMET number corresponds to the DISBUS address of the instrument (see chapter 4.1).

If another VEGAMET has been chosen, the menu item "Input undefined" appears in which you can adjust the input number of the other VEGAMET (see illustration).

The menu items "Min. meas. range" and "Max. meas. range" are only visible with hydrostatic pressure transmitters. Sensor values are stated in the test certificate of the hydrostatic pressure transmitter.



7.5 Configuration of outputs



PC/PLC output and DIS output:
The PC/PLC signal as well as the DIS signal are transmitted via the DISBUS. The PC/PLC output delivers output signals from VEGAMET to an interface converter VEGACOM 557. This interface converter transfers the signals of VEGAMET via different standard protocols to connected systems (DCS/PLC). In the menu items "PLC 1 to" up to "PLC C to…" the measurement loop can be allocated or switched off.

In the menu items "PC/PLC relay status" and "PC/PLC input status" it can be determined that the relay mode and input status are transmitted via the DISBUS.

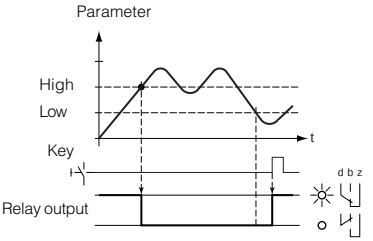
Up to three external indicating elements (VEGADIS 174) can be connected to DISBUS. In the menu items "DIS 1 to…" up to "DIS 3 to–" the measurement loop can be allocated or switched off.

The current, volt and relay outputs are allocated as factory setting to measurement loop "TAG-No. 1". All outputs can be switched off individually (----), i.e., they will no longer access a measurement loop.

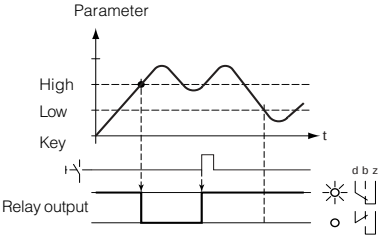
Relay outputs

A hold function or a function for reset of alarm functions can be allocated to each operating relay. In this case, the menu item "Input undefined" appears. There "Input 4" (correction input) can be assigned to the relay. For a description of the relay functions, see the drawing.

Hold function

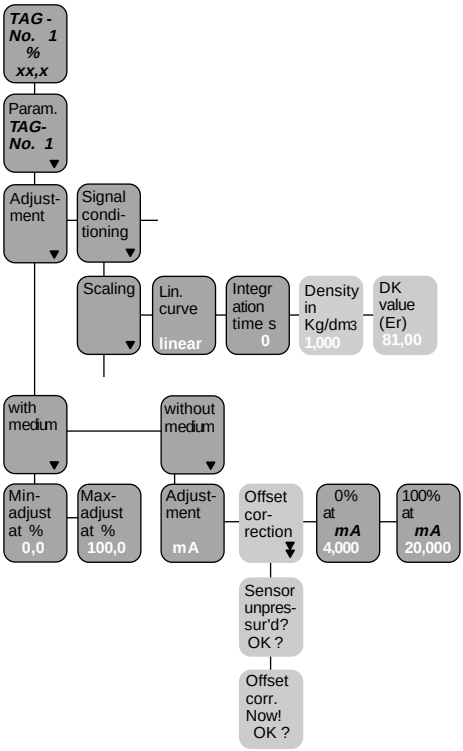


Reset of alarm functions



The relay modes "Hold function" and "Reset of alarm functions" are configured as described above and are each activated by an external signal (correction signal input).

7.6 Adjustment



The **adjustment with medium** corresponds to the procedure in the reduced menu (see appropriate chapter).

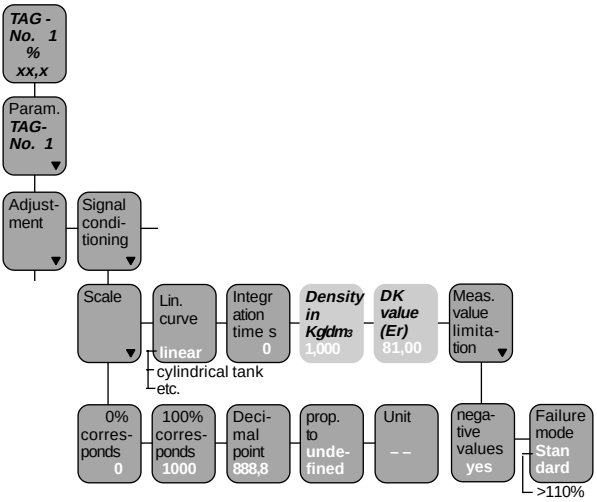
- if the medium is changed later on (medium with another density value or DK value) and no new adjustment can be made or
- if the MET indication and the DIS outputs relate to height in meters,

please note the following:
In applications with hydrostatic pressure transmitters, the adjusted density value must correspond to the value of the medium. In applications with capacitive electrodes, the adjusted DK value must correspond to the value of the medium (water has a density of 1.0 kg/dm³ and a DK value of 81.00).

For the **adjustment without medium,** two anticipated values for level, gauge, etc. corresponding to 0% and 100% must be entered.

The menu item "Offset correction" is opened when hydrostatic pressure transmitters are connected. The offset correction should be carried out after installation of the sensor as the sensor values can differ slightly due to different installation positions (vertical or horizontal installations). With the offset correction, the meas. data of the unpressurised sensor (vessel empty) are detected as correction values and taken into account in all subsequent measurements.

7.7 Conditioning



The menu items "**Scaling**" and "**Integration time**" correspond to the menu items in the "reduced menu" (see appropriate chapter).

The menu items "**Density...**" or "**DK value...**" are optionally displayed when under "Configuration measurement loop" the appropriate sensor type has been selected. The density or DK value must, before adjustment with medium, be so adjusted that it corresponds to the value of the medium (see also chapter "7.6 Adjustment").

The conditioning of VEGAMET can be adapted to different vessel forms. The following linearisation curves are available:
- linear (factory setting)
- horiz. cylindrical tank
- spherical tank
- Lin-curve 1
- Lin-curve 2
- Lin-curve 3
  Lin-curves 1 ... 3 can be edited by the user (see appropriate chapter).

After a scaling or linearisation, the required output must be assigned to the scaled or linearised value (menu item "prop. to..." and "Unit...") under the menu "Parameter adjustment outputs".

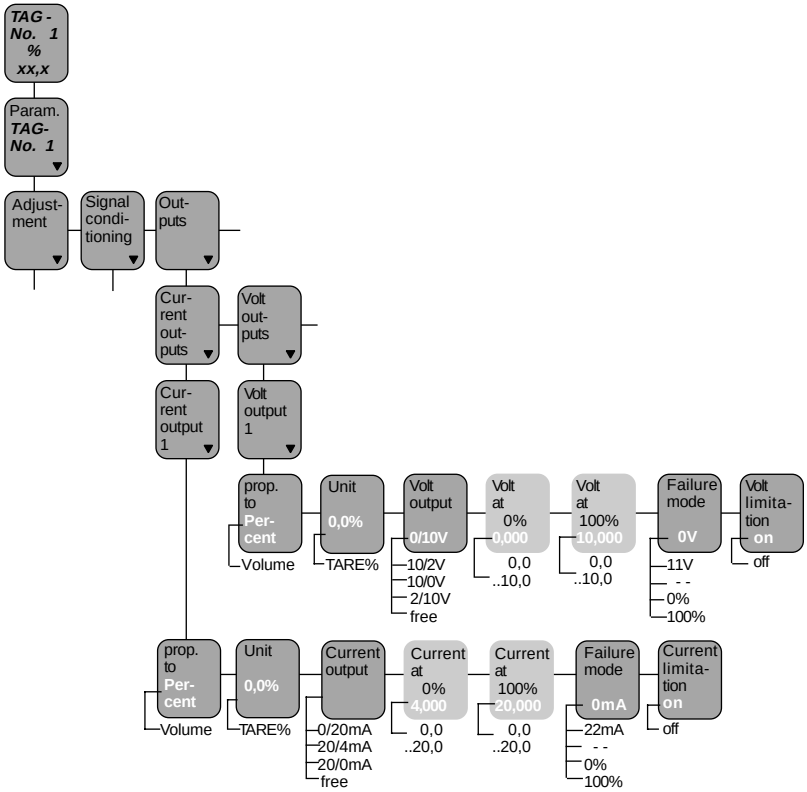
Under **Meas. value limitation** you can exclude negative values.

Failure mode Standard
means that at a sensor current of 3.6 mA or 21 mA the fail-safe relay responds.

Failure mode >110%
also generates a fault signal when a meas. value of more than 110 % or less than -10 % is reached.

7.8 Parameter adjustment of outputs

Current outputs/Volt of outputs



In the menu item "**prop. to**" you can choose between percent and volume. "Prop. to volume" is then useful when under "Signal conditioning - Linearisation curves", for example, a spherical tank or an individually defined linearisation curve is selected. The output current or the output voltage is then proportional to the volume of the tank contents.

Unit:
Selection list dependent on the choice in the previous menu item "prop. to" (see chapter "8 Measuring results and units").

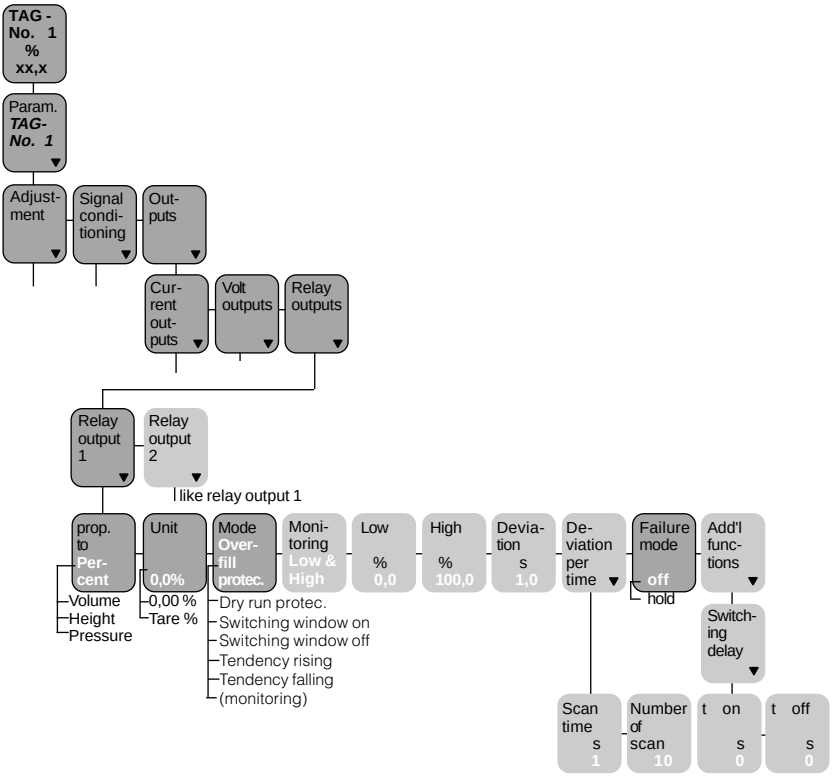
Volt output/Current output:
If "free" is chosen, the following (light grey) menu items appear:

- Volt at 0 %/100 %:
  Individual voltage values between 0 V and +10 V can be adjusted.
- Current at 0 %/100 %:
  Individual current values between 0 mA and +20 mA can be adjusted.

Failure mode:
The height of the output current/output voltage in case of failure is set here. If "--" is chosen, the actual value is maintained.

Volt limitation/Current limitation on:
Voltage/current remain within the values which are given in the menu item voltage output/current output.

Relay outputs



In the menu item "**prop. to**" you choose a parameter that the relay will react to. You can choose between percent and volume ("prop. to volume" is useful when under "Conditioning - Linearisation curves", for example, a spherical tank or a user programmable lin. curve is chosen). In the next menu item you can choose the suitable **Unit**. In the menu item "**Mode**", the mode of the relay can be chosen. The individual relay modes are described on the following pages.

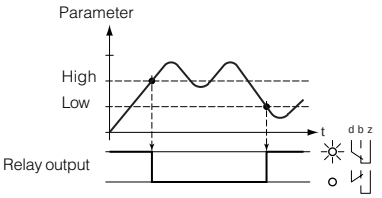
If mode "Tendency rising" or "Tendency falling" is selected, the menu items "Deviation", "Dev. per time", "Cycle time" and "Number of cycles" appear.

With all other modes, the menu items "Low" and "High" appear. There you can determine the switching points for the relay.
The menu item "**Failure mode**" always appears. "Failure mode off" causes the relay to deenergise when a failure (e.g. sensor shortcircuit) occurs. "Failure mode hold" causes the actual relay status to be maintained when a failure occurs.

Under "Add'l functions", you can adjust a switch on delay (t on) and a switch off delay (t off) of the relay to a max. of 600 s (with the relay modes "Tendency rising" or "Tendency falling" no switching delay can be set).

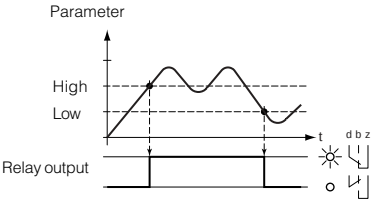
Relay mode "overfill protection"

The relay deenergises at switching point "High" (safe condition).



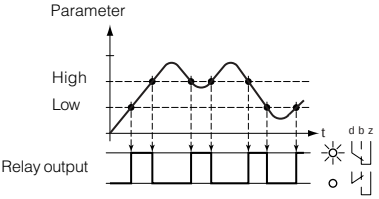
Relay mode "dry run protection"

The relay deenergises at switching point "Low" (safe condition).



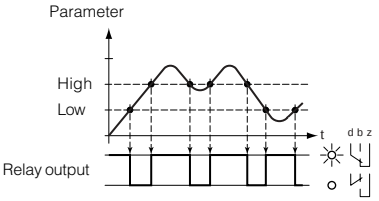
Relay mode "switching window on"

The relay is energised within the switching window.



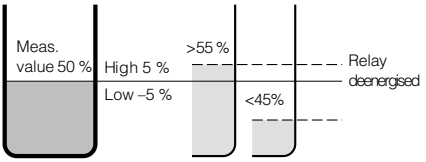
Relay mode "switching window off"

The relay is deenergised within the switching window.



Relay mode "monitoring"

The selected relay energises. By pushing the key switch (opener), the actual measured value is first of all frozen and, derived from this, the relay deenergises of this value is underrun (Low) or exceeded (High). After a reset and a repeated pushing of the key switch, the actual measured value is again frozen.

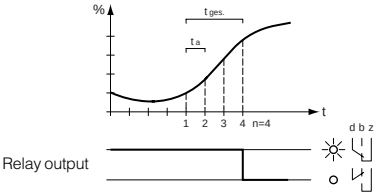


Tendency determination

The level change within the cycle time (ta) is determined and, after all cycles (n), an average value is generated from the sum of the level changes. If this average value exceeds a previously defined % value, the tendency determination responds, i.e. an energised relay deenergises. With the selection "Tendency rising" or "Tendency falling", the menu items "Deviation in %" and "Deviation per time" are opened.

–– Mode Tendency rising

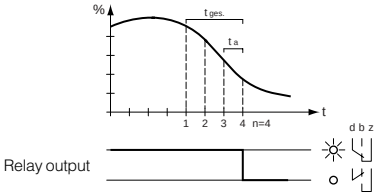
The relay deenergises when the rising average value of "t tot." exceeds the previously defined % value.



ta = cycle time
n = number of cycles

Tendency falling

same dependence, however with falling average value



ta = cycle time
n = number of cycles

–– Deviation in % 2

If the level change exceeds the % value set here, the tendency determination responds.
0 … 110 %
Example 2 % (change) per t tot.

–– Deviation per time

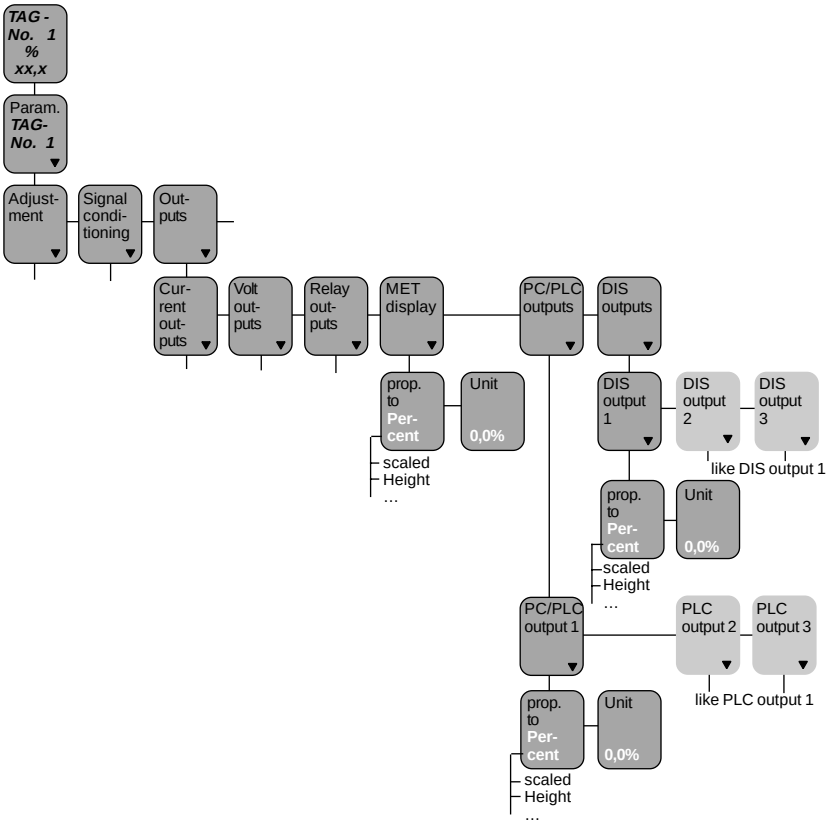
–– Cycle time in s 60

Adjustment range 0 … 999 s
Example: 60 s correspond to 1 minute

–– Number of cycles 4

Adjustment range 0 … 99 cycles
Example: t tot = ta • n = 60 • 4 = 240 s = 4 min, i.e. after every 4 minutes, the average value of the deviation is generated and the result is compared with the given deviation in %, here in the example = 2 %

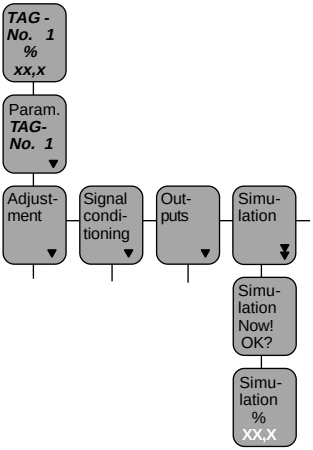
MET indication/PC/PLC outputs/DIS outputs



MET indication/Unit:
In the menu item "prop. to" you choose the parameter to which the VEGAMET display reacts (if you have carried out a scaling under the menu item "Signal conditioning", "prop. to scaled" will have been automatically adjusted, i.e. the display will indicate the scaled value). "Prop. to volume" is then useful if you have selected, for example, a spherical tank or a user-programmable lin. curve under "Signal conditioning - Linearisation curves". The indicated value of the VEGAMET display then reacts proportionally to the volume of the tank contents.

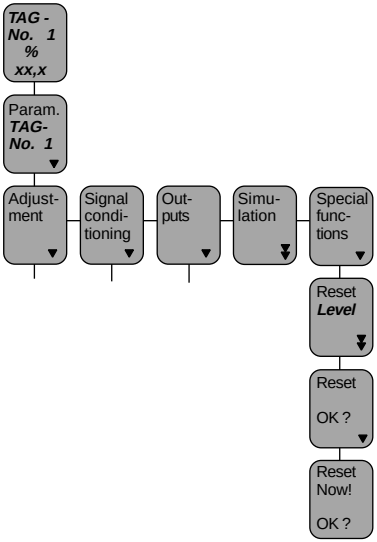
PC/PLC outputs and DIS outputs:
Are adjusted according to the same procedure as the MET indication.

7.9 Simulation



To check the outputs and connected instruments, you can adjust in this menu item any individual percentage value with the keys [+] and [–]. Initial point is always the actual measured value. The indicated value flashes when the simulation is activated. 15 minutes after setting the simulated value, the simulation is automatically terminated and the measured value indication switched back on.

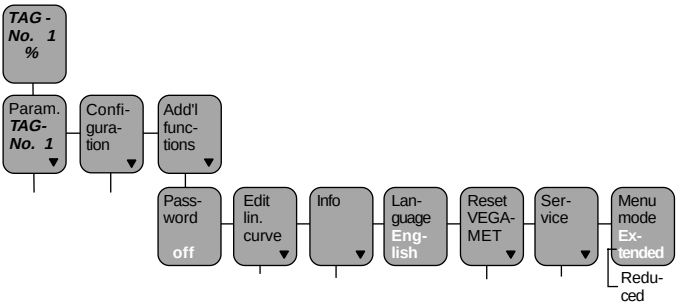
7.10 Special function: Reset



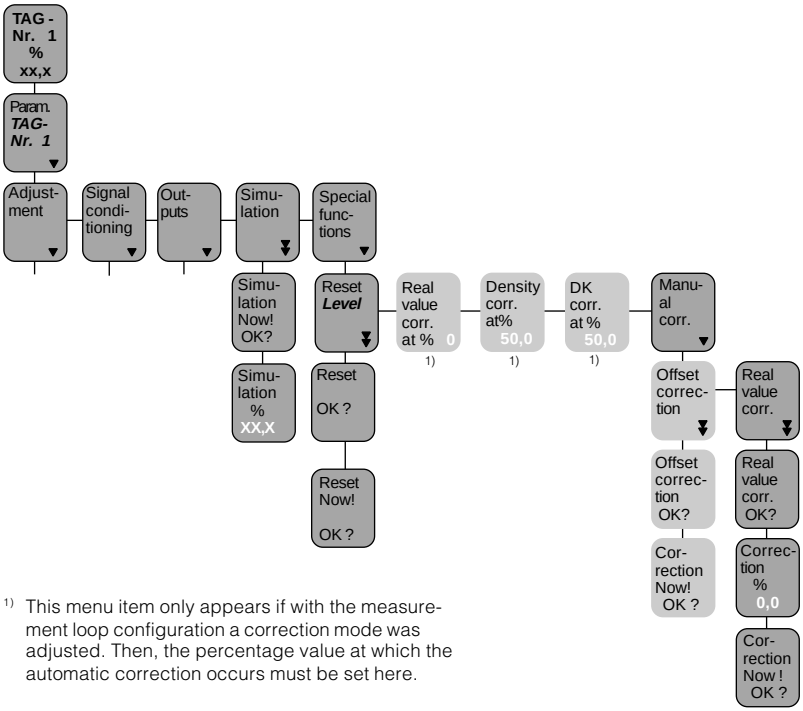
With this reset, all parameter values of the measurement loop TAG-No. 1 are reset to factory setting (empty and full adjustment, relay outputs, current output, volt output and scaling of the meas. value indication are reset).

7.11 Password, language, menu mode

See chapter "6 Settings in the reduced menu".



7.12 Special function: Manual correction

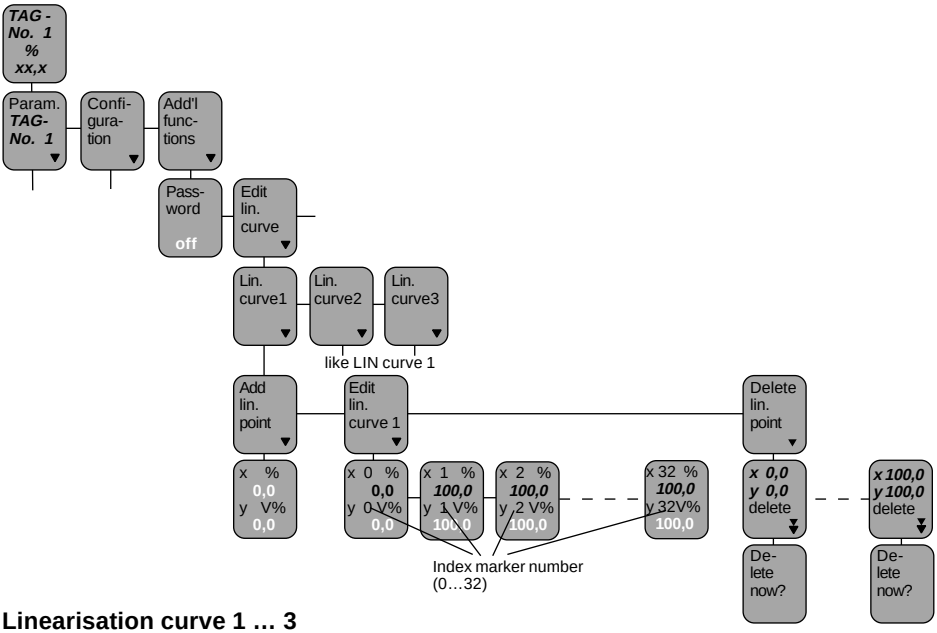


[1] This menu item only appears if with the measurement loop configuration a correction mode was adjusted. Then, the percentage value at which the automatic correction occurs must be set here.

Manual offset correction
(only with hydrostatic pressure transmitters) This correction can be carried out to compensate changes of the sensor values due to ageing. In oder to do this, the sensor must be in an unpressurized condition (empty vessel).

Manual real value correction
In the menu item "Correction % 0.0" you can enter a percentage value which corresponds to the actual level.

7.13 Linearisation curves


TAG - No. 1 % xx,x
Param. TAG-No. 1
Confi-gura-tion
Add'l func-tions
Pass-word off
Edit lin. curve
Lin. curve1
Lin. curve2
Lin. curve3
like LIN curve 1
Add lin. point
Edit lin. curve 1
Delete lin. point
x % 0,0 y V% 0,0
x 0 % 0,0 y 0 V% 0,0
x 1 % 100,0 y 1 V% 100,0
x 2 % 100,0 y 2 V% 100,0
x 32 % 100,0 y 32V% 100,0
x 0,0 y 0,0 delete
x 100,0 y 100,0 delete
De-lete now?
De-lete now?
Index marker number (0…32)

Linearisation curve 1 ... 3

A linearisation curve is created with a number of index markers and their value pairs. A value pair consists of a value for level percent (X %) and a value for volume percent (Y V %). Up to max. 32 index markers can be included. A linearisation curve can be terminated after any individual number of index markers. The signal conditioning instrument terminates the linearisation curve automatically with the values X = 100 % and Y = 100 %.

The data for the value pairs can be determined by incremental filling or can be taken from a table of values provided by the vessel manufacturer.

An Example of incremental filling
Initial situation:
- you have already carried out the 0% and 100% adjustment
- the total volume of the vessel is known to you, for example 300 m^3
- the increment or gauging volume in this example was determined at 15 m^3

1st index marker
- fill the vessel with the liquid quantity of the gauging volume of 15 m^3
- the value for level percent is indicated on VEGAMET, transfer this value into the linearity protocol, column X %
- the value for volume percent must be calculated acc. to the following formula

$$Y\ 1\ V = \frac{100\ \%\ \text{x gauging volume}}{\text{total volume}}$$

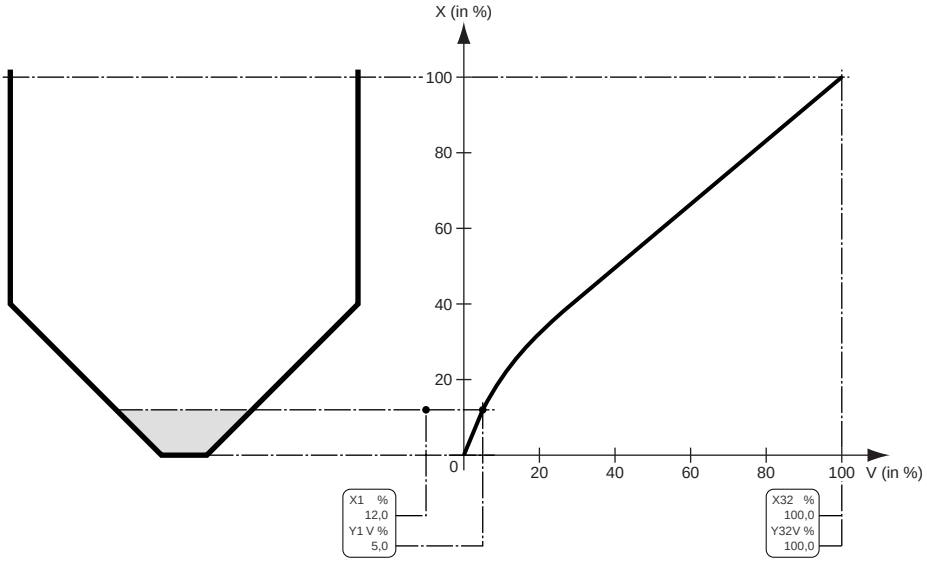
$$= \frac{100\ \%\ \text{x}\ 15\ m^3}{300\ m^3} = 5\ \%$$

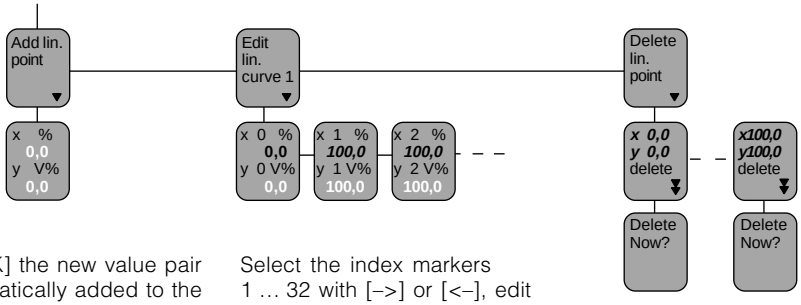
Transfer this value also into the linearity protocol, column Y V %.

2nd index marker etc.

In addition, see the following illustration.

Illustration of a linearisation curve





With [OK] the new value pair is automatically added to the correct position in the linearisation curve. The already present index markers are re-sorted.

Select the index markers 1 ... 32 with [–>] or [<–], edit the Y value with [+] or [–], accept with [OK].

To delete the index markers, select the value pairs with [–>] or [<–]. With [OK] the value pair and the corresponding index marker are deleted in the lin. curve. The remaining index markers move up.

Linearity measurement protocol

A linearisation curve is entered in the menu item "Add. lin. point".

Linearisation curve 1

Index marker no.	Value pair X %	Y V %
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
29		
30		
31		
32		

Linearisation curve 2

Index marker no.	Value pair X %	Y V %
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
29		
30		
31		
32		

Linearisation curve 3

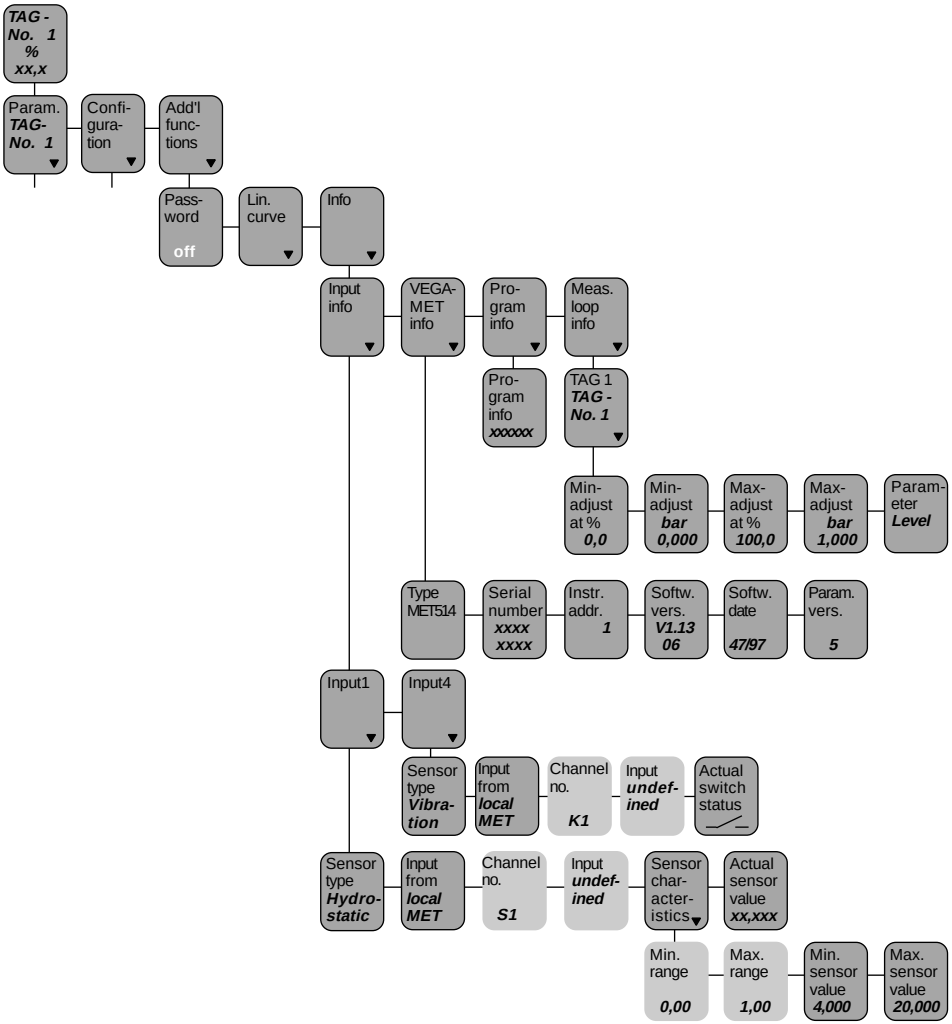
Index marker no.	Value pair X %	Y V %
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
29		
30		
31		
32		

Note

Date

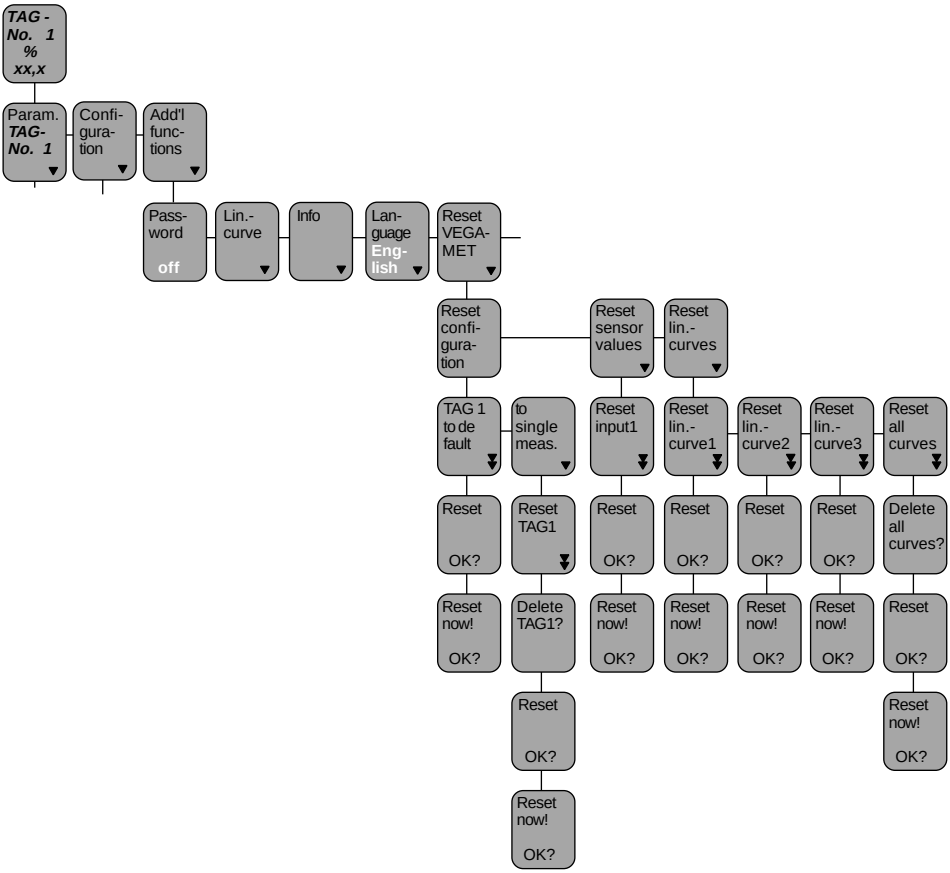
Name

7.14 Info



All menu items under "Info" only have display function.

7.15 Reset VEGAMET



With the function "**TAG 1 to default**" you reset the whole configuration and parameter adjustment to factory setting. However, the basic configuration remains, e.g. "Level measurement/Hydrostatic".

With the function "**Reset TAG 1**" the basic configuration is also deleted. Then the measurement loop must be created completely a new (config. meas. loop).

With "**Reset sensor values**", the adjusted sensor data of the connected sensor are deleted.

With the function "**Reset lin-curves**" you can delete your manually edited linearisation curves.

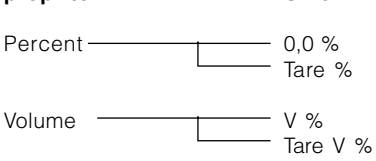
With "Reset all curves" you delete all together, with "Reset lin-curve 1" you always delete only one curve.

The three pre-programmed lin-curves "linear, horiz. cylindrical tank, spherical tank" cannot be deleted.

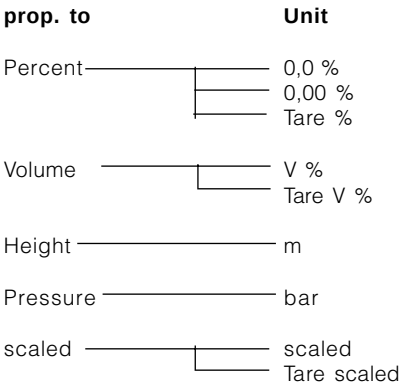
8 Measured quantity and units

With all outputs and with scaling, you find the menu items "prop. to" and "Unit". Here you can choose the measured quantity and the suitable unit. The list of the units depends on the selected measured quantity. In the table, the available units are listed.

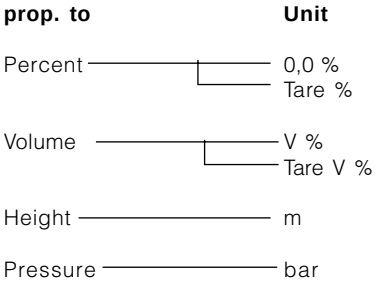
Current/Volt output



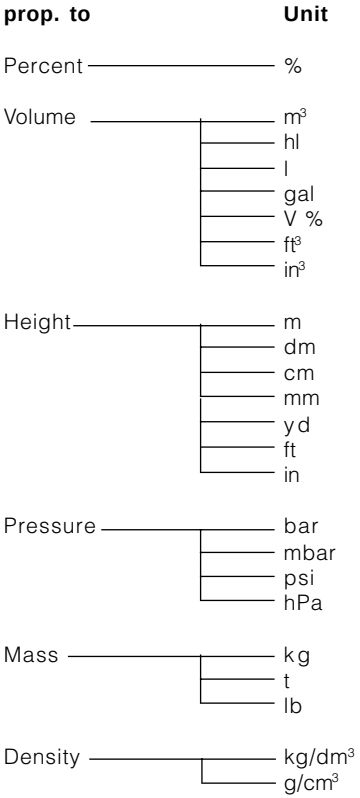
VEGADIS/PLC/MET indication



Relay outputs



Scaling



9 Diagnostics

9.1 Maintenance

The instrument is maintenance-free.

9.2 Simulation

Note
When the simulation is activated, the entire display flashes. The measured data delivered by the sensors are not released for processing; you should, therefore, quit this menu item as soon as possible. After 15 minutes there is an automatic reset to meas. value indication.

9.3 Fault signal

The signal conditioning instrument and the connected sensor are permanently monitored during operation. During the parameter adjustment, the adjusted values are checked for plausibility. In both cases a fault signal can be triggered by irregularities.

In case of failure, an error code is displayed (only within the meas. value indication), the fail-safe relay deenergises, the signal lamp lights and the outputs react according to the preadjusted condition.

The error codes are listed in section "9.5 Error codes" on the following pages.

The diagnosis info is transmitted as a scrolling text info.

Configuration
For each individual measurement loop, you can determine if a fault signal should be triggered or not. See menu "Configuration measurement loop", menu item "Fault signal".

Parameter adjustment
In the menu item "Failure mode" you can determine individually for each measurement loop whether and how an exceeding of the measuring range should trigger a fault signal.

9.4 Repair

For safety and guarantee reasons, repair on the instrument must only be carried out by VEGA staff.

In case of defect, please return the affected instrument with a short description of the fault to our repair department.

9.5 Error codes

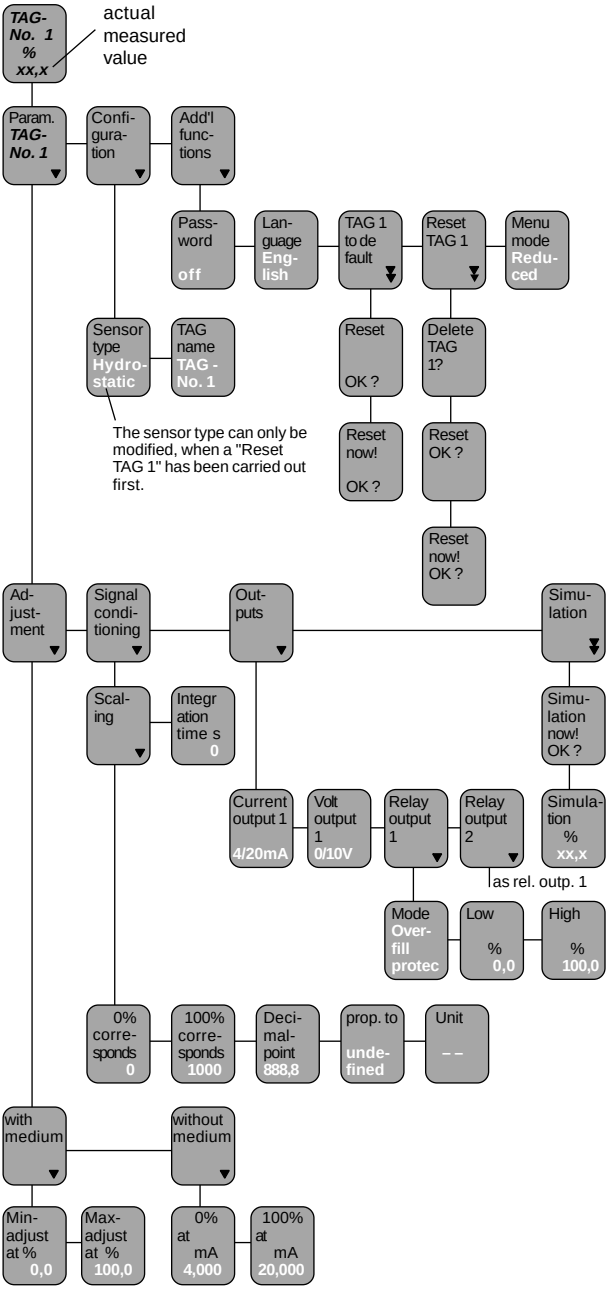
Error code	Meaning
E004	This operation is not supported by the instrument (different software versions). You have tried to activate a function with a newer software version of VEGA Visual Operating in an instrument with older software version. However, the instrument cannot support this operation. Have the software of your instrument updated.
E014	Possible short-circuit Probable reasons: - short-circuit - sensor is defective Check the connection cable and, if necessary, the sensor. Probably - an incorrect measuring range has been set on the capacitive electrode. Adjust a smaller range.
E015	Possible line break Probable reasons: - no sensor connected - line break - sensor is defective Check the connection cable and, if necessary, the sensor.
E016	Empty/full adjustment reversed. The values for the empty adjustment are above the values for the full adjustment. Carry out the adjustment again.
E017	Adjustment span too small. The adjustment values are too close together or are identical. Carry out the adjustment again. Probably - an incorrect measuring range has been set on the capacitive electrode. Adjust a higher range.
E021	Span of the scaling values too small or values reversed. The scaling values are too close together or are identical. Please check the scaling.
E022	Scaling span too big.
E027	Actual measured value is less than -10 %.
E028	Actual measured value is more than 110 %.
E031	Same DISBUS address. At least one other instrument with the same DISBUS address is connected to the DISBUS. Please check the DISBUS address.
E032	Instrument address 0. Instrument address 0 has been set on VEGAMET. With this address VEGAMET does not participate in the DISBUS communication, even if the DISBUS is wired. If necessary, modify the instrument address.

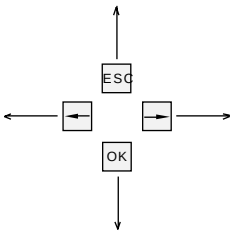
Error code	Meaning
E034	Instrument error. A serious error was detected on the instrument (possibly defective EEPROM). Disconnect voltage and then reconnect (cold start). If the error is not eliminated, please contact your VEGA agency.
E035	Instrument error. A serious error was detected on the instrument (check sum error in EPROM). Disconnect voltage and then reconnect (cold start). If the error is not eliminated, please contact your VEGA agency.
E050	Remote VEGAMET not found. The VEGAMET from which a measured value is expected cannot be found. Reasons: - the remote VEGAMET is not connected - no VEGAMET with this instrument address connected - line break (DISBUS) - shortcircuit (DISBUS) - the remote VEGAMET is defective - disrupted communication (DISBUS) Probably - failure in the DISBUS transmitter/receiver part of VEGAMET Please check the instrument address on both VEGAMETs, the connection cable, the remote VEGAMET and, if necessary, this VEGAMET.
E051	Failure during transmission of measured values via DISBUS. It is not possible to receive a valid measured value via DISBUS from the remote VEGAMET; the communication to the remote VEGAMET, however, is okay. Reason: - failure on remote VEGAMET - the input of the remote VEGAMET, which should be transmitted to, is not yet configured Please check the remote VEGAMET and, if necessary, its input configuration.
E052	The input number of the VEGAMET from which a measured value is expected has not yet been assigned.
E053	Span of the sensor characteristics values too small. The sensor characteristics values are too close together or are identical.
E054	Sensor characteristics values reversed. The min. sensor characteristics value is higher than the max. sensor characteristics value.
E060	Span of the current output values too small. The values for the current output are too close togehter or are identical. Please check the adjustment of the current output.

Error code	Meaning
E061	Span of the voltage output values too small. The values for the voltage output are too close togehter or are identical. Please check the adjustment of the voltage output.
E063	Incorrect sensor characteristics values. Please check the sensor characteristics values
E102	A reset of the configuration was carried out on this VEGAMET via the key-board.
E110	Switching hysteresis to small. The switching points are too close together or are identical.
E111	Relay switching points reversed. The relay switching points are reversed with respect to the selected relay mode.

10 Menu schematics

10.1 Menu schematic "reduced menu"





With these keys you move in the menu field

Sensor mode ***Hydro-static***

Bold print/italic is the sensor or measured value information which cannot be modified in this position.

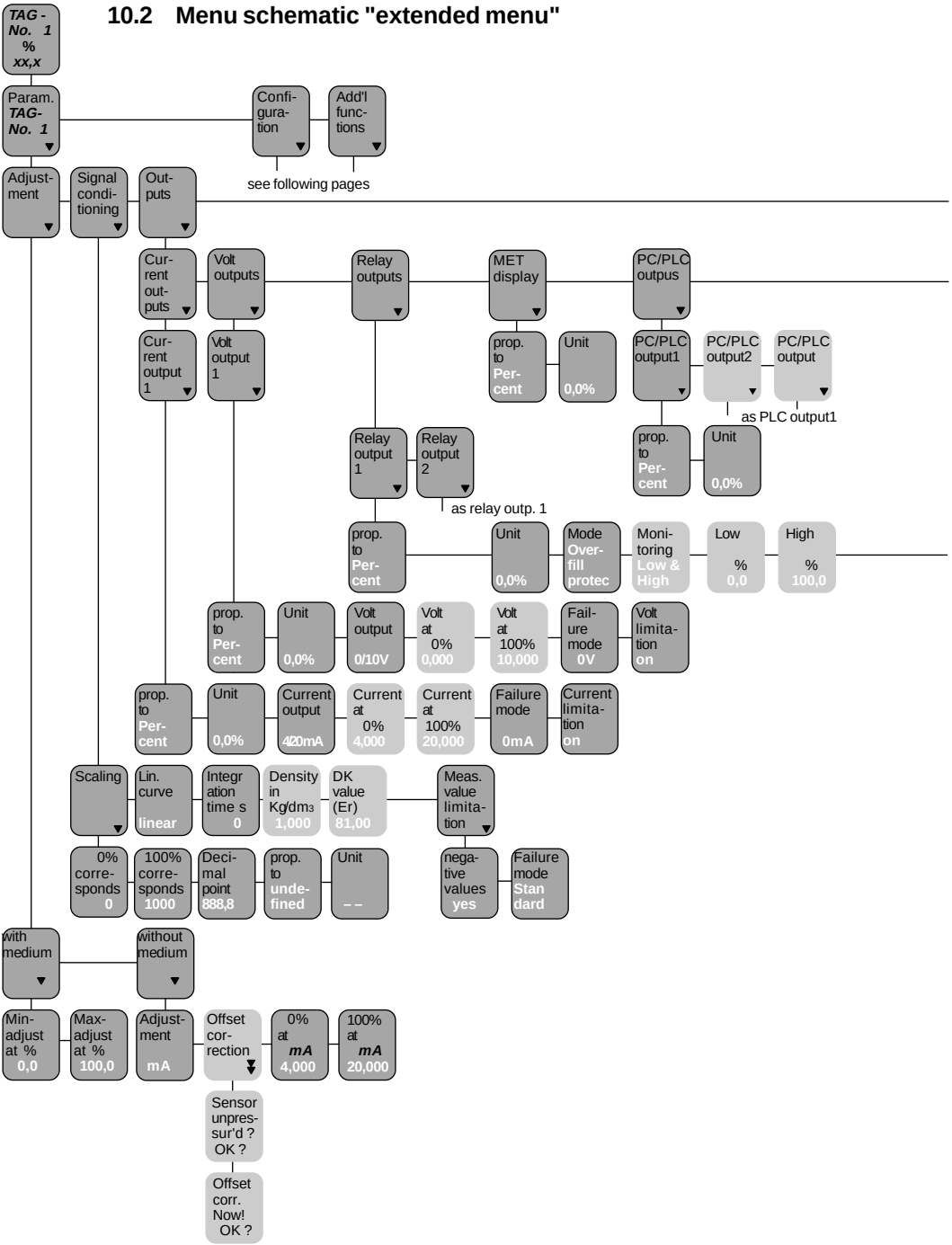
Lan-guage **Eng-lish**

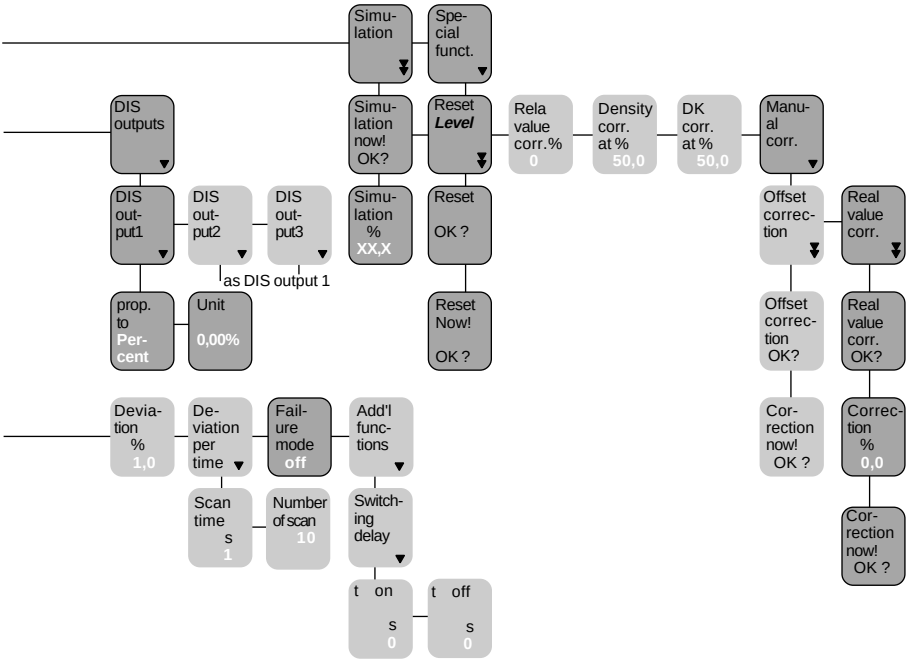
In white letters you can see the parameters which can be modified with the [+] or [–] key and saved with the [OK] key.

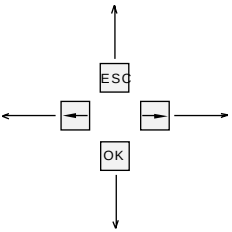
Cur-rent at 100% 20,000

Light grey menu items are only displayed if necessary (depending on the adjustment in other menu items).

10.2 Menu schematic "extended menu"







With these keys you move in the menu field

Sensor type ***Hydro-static***

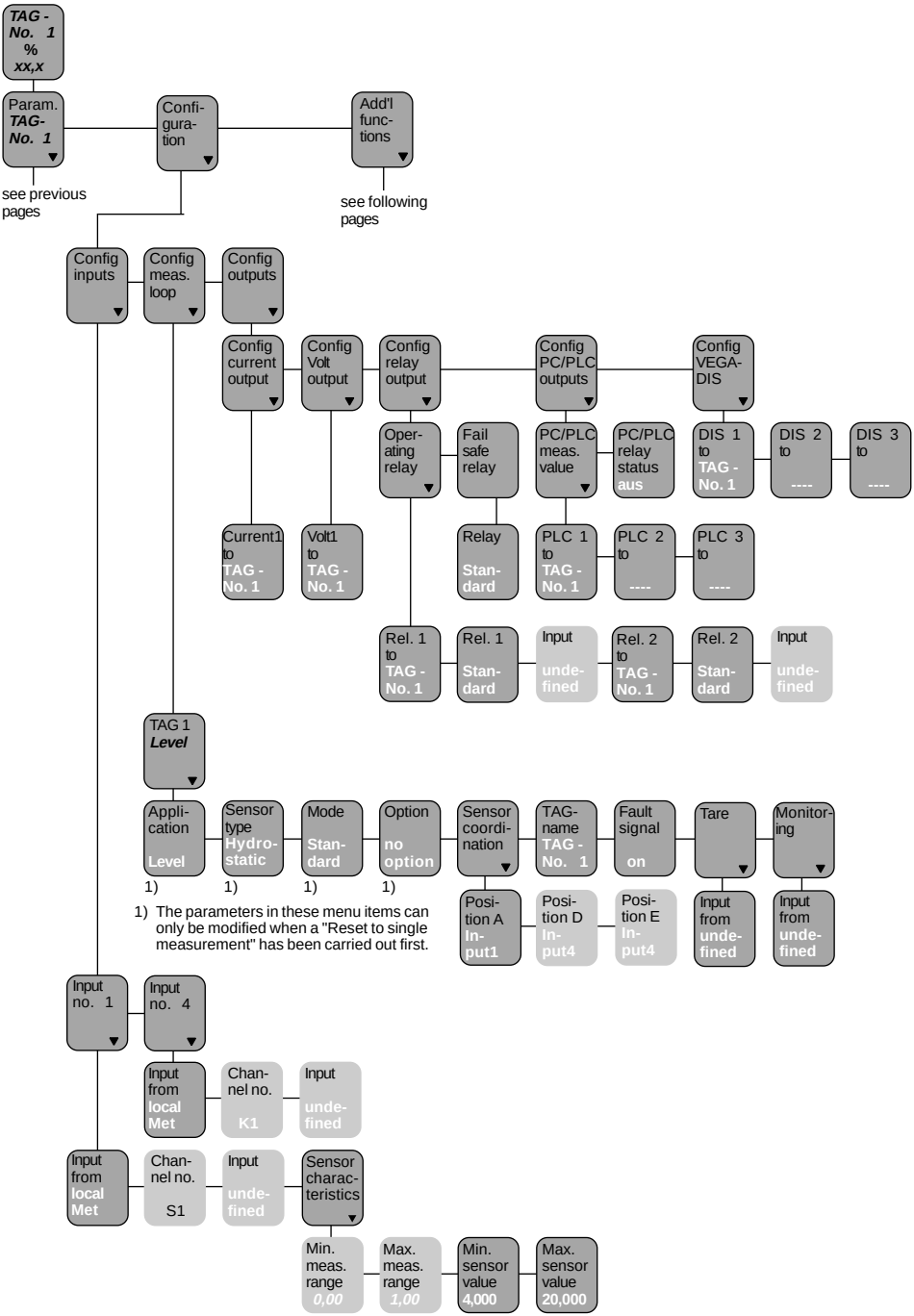
Bold print/italic is the sensor or measured value information which cannot be modified in this position.

Lan-guage **Eng-lish**

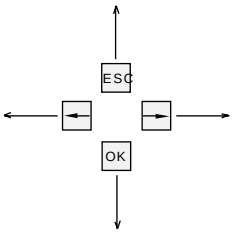
In white letters you can see the parameters which can be modified with the [+] or [–] key and saved with the [OK] key.

Current at 100% 20,000

Light grey menu items are only displayed if necessary (depending on the adjustment in other menu items).



1) The parameters in these menu items can only be modified when a "Reset to single measurement" has been carried out first.



With these keys you move in the menu field

Sensor type ***Hydro-static***

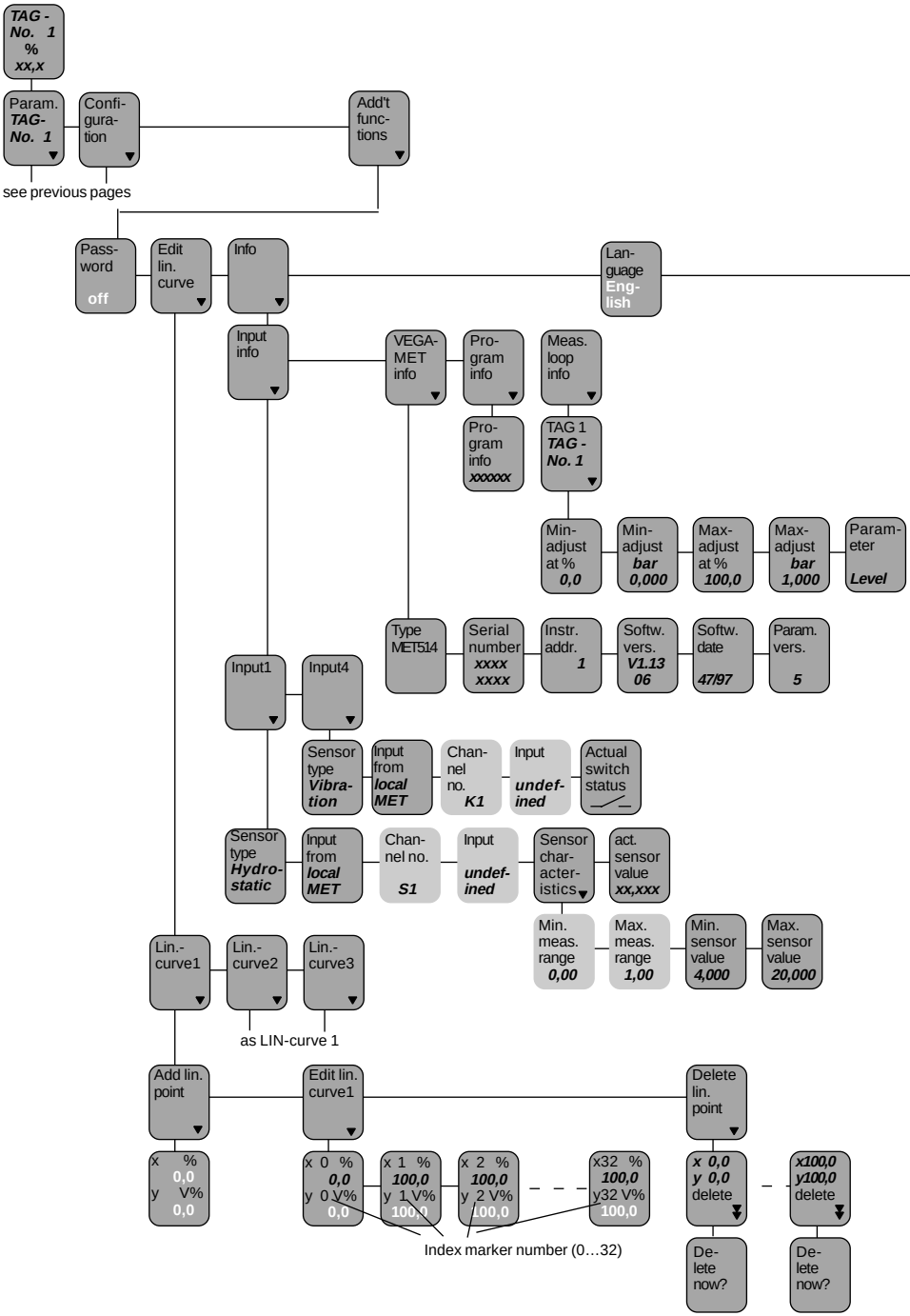
Bold print/italic is the sensor or measured value information which cannot be modified in this position.

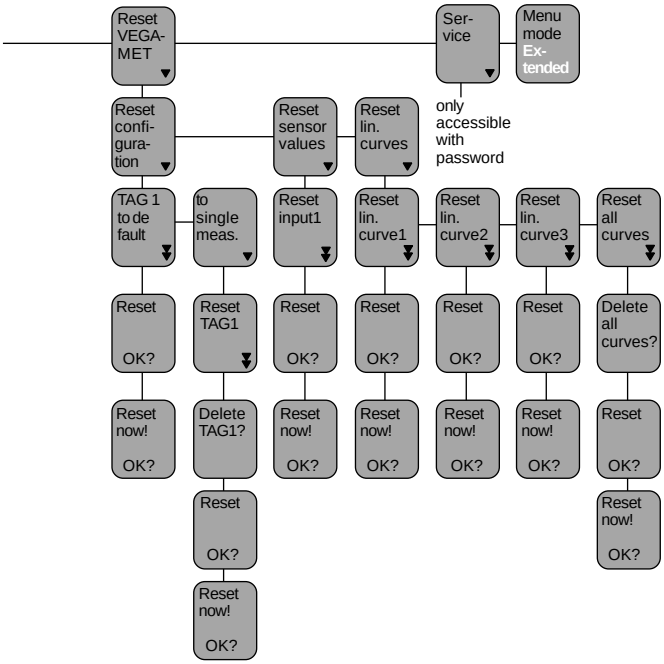
Lan-guage **Eng-lish**

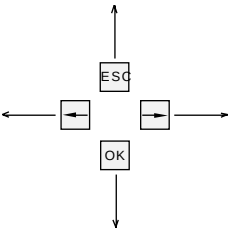
In white letters you can see the parameters which can be modified with the [+] or [–] key and saved with the [OK] key.

Current at 100% **20,000**

Light grey menu items are only displayed if necessary (depending on the adjustment in other menu items).


TAG - No. 1 % xx,x
Param. TAG- No. 1
Confi- gura- tion
Add't func- tions
see previous pages
Pass- word off
Edit lin. curve
Info
Lan- guage Eng- lish
Input info
VEGA- MET info
Pro- gram info
Meas. loop info
Pro- gram info xxxxx
TAG 1 TAG - No. 1
Min- adjust at % 0,0
Min- adjust bar 0,000
Max- adjust at % 100,0
Max- adjust bar 1,000
Param- eter Level
Type MET514
Serial number xxxx xxxx
Instr. addr. 1
Softw. vers. V1.13 06
Softw. date 47/97
Param. vers. 5
Input1
Input4
Sensor type Vibra- tion
Input from local MET
Chan- nel no. K1
Input undef- ined
Actual switch status
Sensor type Hydro- static
Input from local MET
Chan- nel no. S1
Input undef- ined
Sensor char- acter- istics
act. sensor value xx,xxx
Min. meas. range 0,00
Max. meas. range 1,00
Min. sensor value 4,000
Max. sensor value 20,000
Lin.- curve1
Lin.- curve2
Lin.- curve3
as LIN-curve 1
Add lin. point
Edit lin. curve1
Delete lin. point
x % 0,0 y V% 0,0
x 0 % 0,0 y 0 V% 0,0
x 1 % 100,0 y 1 V% 100,0
x 2 % 100,0 y 2 V% 100,0
x32 % 100,0 y32 V% 100,0
x 0,0 y 0,0 delete
x100,0 y100,0 delete
Index marker number (0…32)
De- lete now?
De- lete now?





With these keys you move in the menu field

Sensor type ***Hydro-static*** — Bold print/italic is the sensor or measured value information which cannot be modified in this position.

Lan-guage **Eng-lish** — In white letters you can see the parameters which can be modi-fied with the [+] or [–] key and saved with the [OK] key.

Cur-rent at 100% 20,000 — Light grey menu items are only displayed if necessary (de-pending on the adjustment in other menu items).

VEGA

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www.vega.com

Safety information

Please read this manual carefully, and also take note of country-specific installation standards (e.g. the VDE regulations in Germany) as well as all prevailing safety regulations and accident prevention rules.
For safety and warranty reasons, any internal work on the instruments, apart from that involved in normal installation and electrical connection, must be carried out only by qualified VEGA personnel.

Note Ex area

Please note the attached safety instructions containing important information on installation and operation in Ex areas.
These safety instructions are part of the operating instruction and come with the Ex approved instruments.

ISO 9001 VEGA

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the latest information at the time of printing.

Technical data to subject to alterations